

# The Chemical Age

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**NOTICES:**—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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## America's Chemical Jubilee

THE "Golden Jubilee Number" of the Journal of the American Chemical Society, published in connection with the jubilee meetings which the Society is holding this week in Philadelphia, is a volume of great interest and a fitting memorial of the occasion. The chapters by representative American chemists, who describe a half-century's progress in the fields they know best, is a valuable piece of contemporary history, resembling in some ways the important volume *Chemistry in the Twentieth Century*, produced some time ago in this country. But of peculiar personal interest are the memories reproduced of "The Priestley Centennial," the historic gathering in 1874 round the grave of the discoverer of oxygen that resulted two years later in the foundation of the American Chemical Society. Some of the passages from the speeches delivered then come to use even now with a remarkably quickening effect.

The list of contents sufficiently indicates the wide range of the contributions. Following Dr. C. A. Browne's introduction, we have in Part I, "The Priestley Centennial," by Samuel A. Goldschmidt;

"The Organisation of the American Chemical Society," by William H. Nichols; "The Evolution of the American Chemical Society," by Frank Wigglesworth Clarke; "The First General Meeting and the First Local Section of the American Chemical Society," by Charles E. Munroe; and "The Activities of the American Chemical Society," by Charles L. Parsons. Part II consists of reviews of progress in various branches of chemistry in America, namely, "Mineral Chemistry," by Edgar F. Smith; "Physical Chemistry," by Wilder D. Bancroft; "Inorganic Chemistry," by James Lewis Howe; "Organic Chemistry," by Treat B. Johnson; "The Chemistry of Physiology and Nutrition," by Graham Lusk; "Agricultural Chemistry," by Charles A. Browne; "Industrial Chemistry," by Charles E. Munroe; and "Chemical Education," by Samuel R. Powers. Although the sectional method of treatment has its disadvantages, the total effect is a very comprehensive survey that possesses far more than a passing interest.

## Modern Factory Conditions

THE annual report for year 1925 of the Chief Inspector of Factories, just issued, is reviewed at length, as regards its chemical bearings, elsewhere in this issue. The chemical industry is included under the heading of dangerous trades, and it is gratifying to find that in the view of the inspecting staff the requirements of the regulations are, on the whole, being well carried out. The total of all accidents reported in 1925 in the industries dealing with chemicals, paints, colours and varnish, animal charcoal and glue-making was 3,667, with 45 deaths. The highest proportion of deaths occurred in a part of the work which was not strictly "chemical"—i.e., seven deaths in 42 accidents with transmission machinery. Some idea of the attention paid to the workers is indicated by the fact that the number of examinations made by certifying or appointed surgeons in regard to workers in nitro or amido processes was nearly 30,000, as a result of which 91 persons were suspended from work. In this connection it is of interest that there were 31 cases of aniline poisoning, including one death. This shows that a substance which the laboratory or research worker regards as harmless may become very dangerous on the large scale; it also indicates the importance of medical inspection.

The creation of a "Safety First" consciousness in both employers and employed is ultimately one of the foundations of a well-run factory. The report indicates that interest in the "Safety First" movement is being steadily maintained and that in certain areas there has been substantial progress. But there is still a certain amount of resistance, sometimes on the part of employers and managers, who feel that safety committees may be derogatory to their authority;

sometimes on the part of workers who fail to benefit by warnings. Attention may be drawn to the case of one factory where an energetic man was appointed safety engineer, the conditions regarding safety being thoroughly overhauled. The comment of the inspector is noteworthy: "There has been a large reduction of accidents at this works, and it has proved a paying proposition." Without specific reference to chemical works as distinct from others, it is of interest to note that a five-day week has been introduced into a number of factories, in many cases because of bad trade; it is not yet possible to foretell whether it will become a permanent and general institution. There is no general claim that the system leads to increased output, but, on the other hand, diminution of output has not been observed. To the employees such a system is in many respects a great advantage.

Among other matters of chemical interest mentioned in the report are the rapid growth and development of the sugar-beet industry, the duplication of the synthetic ammonia plant referred to in the 1924 report, and the increasing production in the North-Eastern division of synthetic hydrochloric acid.

### Bleaching Powder Manufacture

THE production of increasing quantities of electrolytic caustic soda has introduced a problem to which reference has been made in our columns from time to time. We refer to the chlorine and hydrogen released in the electrolysis of the brine solution. In some of the works in Italy the chlorine is combined with hydrogen to form synthetic hydrochloric acid which is absorbed in water and run to waste. On the geographical situation of a works depends the ease or difficulty with which chlorine can be profitably utilised. During the last two years it has been gratifying to observe an increase in the exports of bleaching powder from this country. To what cause this increase is attributable it is not easy to say. Probably several factors have contributed their quota. No doubt, lower prices, due to a reduction in manufacturing costs, have not been without their influence.

The old method of absorbing chlorine by means of slaked lime in lead chambers, although effective, was an expensive method in point of labour, and not infrequently an unpleasant job. The recent publication of data concerning the Backman process is not, therefore, without interest. It not only leads one to consider the chemical engineering aspect of the absorption of chlorine in slaked lime, but naturally stimulates reflection on the subject of the underlying physico-chemical principles involved in the production of bleaching powder. The absorption of chlorine in calcium hydrate (slaked lime) is an exothermic reaction, and in the old bleaching powder chamber process this heat was dissipated *via* the lead walls of such chambers. With the later types of plant—Hasenclever and Rudge—other suitable provision had to be made. It is known that temperature has an important influence on the production of bleaching powder. Lunge's experiments suggest that 40–50° C. was the optimum temperature. With an increase of temperature, the speed of reaction between chlorine and slaked lime should increase. On the other hand, the greater the temperature, the greater the tendency

for the calcium hypochlorite to be changed to calcium chloride. Similarly, higher temperatures promote decomposition of the bleaching powder, with the formation of calcium chloride, and the release of oxygen.

In view of the foregoing, it is clearly necessary to decide whether output per unit of plant shall be sacrificed for quality, or conversely, whether quality shall be the dominant consideration. Many have affirmed that the reaction between chlorine and calcium hydrate yields hypochlorite in the cold, and chloride in the hot. Practical working has revealed that temperature is not the only or, indeed, the deciding factor. The amount of alkali present plays an important, if not the most important, part. With thick layers of lime, it is known that the upper portion may frequently be chlorinated too much, whereas the lower portion is incompletely chlorinated.

Moisture, too, functions in a significant way in the absorption process. Some suggest that an excess of water of 4 per cent., calculated on the weight of the hydrated lime, gives the best results. Further, it is stated that this moisture should be introduced with the lime, and not with the gas. Others assert that the best results can be obtained with dry chlorine gas, and about 7 per cent. excess water in the lime. Further claims are made that it is necessary to have a gas saturated with moisture and only about 1 per cent. of excess moisture in the lime. Despite these conflicting counsels, it would appear that what is necessary is that the moisture contents of the lime and the gas should be as uniform as possible. Slaked lime should be stored for several days, and should be thoroughly mixed, in order to lessen irregularities. Bleaching powder with over 40 per cent. of chlorine is obtained by introducing water during the last stage of the chlorination.

### The Backman Process

THE Backman chlorinating chamber is simple in construction, and resembles, as it were, a combination of two mechanical burners in one. Reinforced concrete is used, with the exception of the top silo, which is made of wood or brick. The chambers are of square section. Scraper arms are made of iron which is treated in a special way. An important feature is the provision of cooling coils, which are embedded in the intermediate floors, except the upper one. It will be appreciated that this plant divides the process of chlorination into several stages—one for each shelf. Superheating and superchlorination are avoided by the lime descending from shelf to shelf, and by the artificial cooling which takes place. Occluded chlorine—a source of difficulty with some makes of bleaching powder—is avoided by introducing a small quantity of dry air in the collecting silo. By storing the bleaching powder on the lower floor, the bulk of the occluded chlorine is released. This improves the conditions under which the workers employed in the filling of the casks operate.

By reason of exact temperature regulation, and the steady movement of the lime, it is claimed that the bleaching powder produced by this plant has a higher content of available chlorine than that produced by most other apparatus. The standard capacity of the

chambers is 2-2½ tons of bleaching powder per twenty-four hours. At this capacity, when employing at least a 60 per cent. chlorine gas mixture, the smell of chlorine in the waste gases is negligible. If further dilution takes place, either a somewhat less production is obtained, or absorption towers have to be placed after the chambers. It is certain that the merits of the Backman mechanical bleaching powder plant will need to be carefully considered by chemical engineers in connection with any future installation of apparatus that they may be called upon to design for the production of bleaching powder.

### The Future of Chilean Nitrate

A STATEMENT of considerable interest on the future of the Chilean nitrate industry and its relation to the synthetic ammonia industry was made by Mr. T. T. Aikman at the annual meeting of the British and South Pacific Trading Co., Ltd. The only satisfactory solution of the difficulties confronting the nitrate interests is, he thinks, an agreement between the German synthetic nitrogen combine (now the I.G. Farbenindustrie) and the Chilean nitrate industry, by which the sales of nitrogen by either party would be regulated by the world's demands and an extensive scheme of joint propaganda organised. Nothing is said about the British Sulphate of Ammonia Federation in this connection, but it may be pointed out that the British and German interests have been working together in several directions, especially in the matter of propaganda, as was seen in the recent joint conference at Biarritz. It is not likely that the British Federation would consent to be a mere spectator while such arrangements were proceeding. Mr. Aikman's suggestion is, of course, dependent on free selling of nitrate, which he estimates will come into operation by July of next year, if not earlier. But here, again, the attitude of the Chilean Government has to be reckoned with, though the fear of ultimately ruining their great industry may compel them to give way.

The price factor is the one that must ultimately decide the issue. It is estimated that the German cost of production would allow synthetic sulphate to be sold in Germany and adjacent countries at £7 to £7 10s. per ton, with an additional 10s. or £1 to more distant consumers. On the basis of free selling Mr. Aikman's estimate is that Chilean nitrate could be sold at £6 10s. to £7 per ton to consumers in various parts of the world at current prices. On this basis, Chilean nitrate might compete successfully. If, however, the present situation is allowed to drift his prediction is a price war that will eventually ruin both industries. Or, as some might prefer to put it, a price war that, while inevitably damaging the stronger interest, might destroy the weaker.

### A New Trimethylamine Process

SOME interesting information has just reached us respecting a new process of manufacturing trimethylamine and dimethylamine, which has been developed by Dr. D. K. Tressler and his assistants at the Mellon Institute of Industrial Research of the University of Pittsburgh. These amines, we understand, are to be marketed as the hydrochlorides, which will be very pure and will not be mixtures of the amines.

The process, it is claimed, will reduce the cost of production considerably and will thus make available large quantities at relatively low prices.

The principal use of dimethylamine is in the manufacture of rubber accelerators. It is an attractant for the cotton boll weevil and may find use in the preparation of poison baits. Trimethylamine or mixtures of trimethylamine and dimethylamine may be used for the same purpose. Both trimethylamine and dimethylamine may be used for the preparation of methyl chloride. In Europe crude trimethylamine, which contains much dimethylamine and monomethylamine, has been used for this purpose for some time. Trimethylamine has been suggested for use in the preparation of potassium carbonate, according to a process resembling the Solvay process for the manufacture of sodium carbonate, except that trimethylamine is used in place of ammonia. This amine possesses an advantage over ammonia, inasmuch as it is much more soluble in water, and, therefore, a larger yield of the carbonate may be obtained. Low priced trimethylamine should make this process economically feasible. The researches concerning the properties and uses of these amines are being continued at Mellon Institute, and probably will disclose other commercial applications.

### Rubber Coagulants

WE learn from a trustworthy source that the Department of Agriculture, Straits Settlements and Federated Malay States, has recently had under consideration the question of the use of alum as a rubber coagulant. A few years ago, owing to reports from United States manufacturers on the quality and especially the low rate of vulcanisation of rubbers coagulated by the addition of alum to the latex, a heavy import duty was placed on alum imported into the Federated Malay States, where up to that date it had been largely used by Asiatic smallholders. A questionnaire has now been sent by the *Agricultural Chemist* to a large number of British, European and American rubber manufacturers with a view to ascertaining whether the prohibitive import duty on alum should be maintained. Replies received indicate that the reintroduction of alum as a coagulant would almost certainly tend to greater variability in respect of rate of vulcanisation, and they point out that such variability is still of considerable importance in spite of the more extended use of powerful organic vulcanisation accelerators which do not entirely eliminate original variability of the raw rubber. Investigations into the value of formic acid as a coagulant indicates that it is a good and cheap substitute for acetic acid and has no harmful effect on the rubber. The amount required for coagulation is only approximately half that required in the case of acetic acid, so that even at an equivalent price its use should prove an economy.

### The Calendar

Sept 20 to 24	Chemists' Exhibition.	St. Andrew's Hall, Glasgow.
26— Oct. 3	Société de Chimie Industrielle: Sixth Congress of Industrial Chemistry.	Brussels.



## Conditions in Factories and Workshops

### Annual Report of the Chief Inspector

*The Annual Report of the Chief Inspector of Factories and Workshops for the year 1925 (London: H.M. Stationery Office. Pp. 139. 2s. 6d.) has just been published. We note below those parts of the report having a chemical bearing.*

In the portion of the report dealing with dangerous trades, it is stated, under the heading of chemicals, that the general view of the staff is that on the whole the requirements of the regulations are being well carried out. What may be described as the "permanent" requirements are the best observed; where failure has been noticed it is in the matter of upkeep, such as neglect to keep records of examination of interior of stills, of examination of oxygen apparatus, and failure to maintain oxygen apparatus in good order, especially in works where the regulations apply only to a limited extent. The district in which the regulations are of particular importance is Warrington. As (states the report) the works in the Warrington district include representatives of most of the classes of manufacture which constitute the chemical industry, from heavy chemicals to fine chemicals, and numerically form one-fifteenth of the total number of factories and workshops under Chemical Works Regulations, and a considerably higher proportion of the number of workers, the conditions pertaining in this district may be taken to be fairly typical of the general situation.

#### Improvement of Conditions

The past year has seen almost the completion of the work of clearing up the few remaining instances where full conformity with all the rules had not been attained, so that the chief matter of interest is to look for any indication of the effectiveness of the regulations in achieving their object. It seems evident that the degree of observance of the code must be reflected in the accidents reported both as regards their number and their nature. It is, therefore, satisfactory to find that the 584 accidents reported from chemical works in the Warrington district represent a reduction of 14 per cent. on the previous year. To some extent this reduction may be said to be due to the fact that employment during 1925 did not fully maintain the point reached in 1924, but the same might be said of most other industries, and yet the total accident reports received from all industries combined is practically unaltered, the reduction being even less than 4 per cent.

In factories other than chemical works, machinery is usually the active agent for adaptation of the material to the desired product, and accidents due to machinery account for 12 per cent. of the total, whereas injuries due to the nature of the material, *e.g.*, burns, scalds, caustic burns, are only 5 per cent. In chemical works the position is about reversed, only 5 per cent. of the accidents were due to machines, whereas scalds and similar injuries (regulations 1, 10 and 18) were nearly three times as many. It is really only among the 84 accidents of this character (14½ per cent.) and in gassing cases (regulations 6, 7, 8 and 9), of which there were but four in the whole year, where there is now much scope for further accident reduction by means of the regulations. The bulk of the other accidents are falls of persons or things, use of hand tools, or other miscellaneous causes mainly preventable only by personal care, and in some chemical works a good beginning has been made in supplementing the training and practice of the ambulance staff required under regulations 12 to 14 by making the members an active interested nucleus of Safety First propaganda in their respective departments. The same line is the most promising to secure reduction in accidents preventable by regulation 10, for of the scalds and caustic burns a third were eye injuries and yet in no case was there any failure to provide goggles (regulation 10 (b)), and the neglect to use them (regulation 17) can best be remedied by the example or persuasion of more responsible fellow workers. First Aid (regulation 11) is now generally well arranged, schemes being usually in operation for training sufficient men (regulation 14), and the beneficial results seem to be indicated in the fact that cases of septic poisoning in chemical works in the district were only 5 per cent. of the total accidents.

#### Observance of Prescribed Precautions

Two cases of gassing, neither of which were serious, were due to chlorine gas; they arose from minor unexpected escapes

and not from neglect of any precaution. Liquid chlorine necessarily under considerable pressure is now made and handled in large quantities (and the bulk of it is made and despatched from the Warrington district), and the fact that only two unimportant cases of gassing occurred is satisfactory evidence of a general and careful observance of the prescribed precautions. Nor are the producers of liquid chlorine satisfied with their own practical immunity, for they also do all they can to advise the users regarding safe methods of manipulation. The other two gassing cases illustrate the great importance of regulation 2 (c), for two men were poisoned by arseniuretted hydrogen, and one died from the effects. It was believed adequate measures had been taken to prevent inhalation of any of the fumes given off in the process, but they appear to have proved insufficient under certain combined unusual atmospheric and working conditions, and the exhaust draught was unable to prevent the escape of some of the gases into the workroom. The arrangement has since been modified so as to be able to cope with any conditions. This case was the only fatality in a chemical works ascribable to a chemical process.

All accidents in which there was any cause to suspect that they might be due to neglect to observe statutory obligations, were fully investigated at the factory, but in only four instances could the occurrence be said to be due to failure to carry out one or another of the regulations. In two cases the fault was with the employer, one being due to ineffective draught (the fatal gassing case) and one to insufficient eye-wash bottles, but in each case the defect was not realised or apparent before the occurrence. The other two were the fault of the worker, one through not using gloves in handling nitric acid and one due to putting a plank to stand on at the side of a vat of hot water. Accidents such as these last two are of course difficult to prevent; neglect or improper conduct usually can only come to light when an accident occurs, and although regulation 17 making a worker liable to a penalty in such cases, must be a deterrent increasing in value as it becomes better known, human nature will probably be more effectively and permanently influenced by reason and persuasion on Safety First lines.

#### Special Recommendations Regarding Stills

The question having arisen as to the precautions that should be taken before any person is allowed to enter a still after it has been opened, the matter was discussed with representatives of the Association of British Chemical Manufacturers and the Association of Tar Distillers, with the result that the following recommendations were agreed to.

*Chemical Works Regulations, 1922.*—The Joint Committee of Group V. of the Association of British Chemical Manufacturers and the Association of Tar Distillers having had an opportunity of consultation with the Chief Inspector of Factories, strongly urge upon their members the following Recommendations, which are intended to ensure compliance with the regulations and the avoidance of gassing accidents:—

1 (a) *Preparation of Tar and Pitch Stills.*—The decision to open a tar still for entry should be made and the instructions issued, before the charge has been run off. If a cold still is to be opened for cleaning, then if the mechanical arrangements make it possible for a fresh charge to be run, this should be done, and the procedure should then be as for a hot still. Immediately the charge has been run off, the still should be blown through with live steam, and afterwards opened and the steaming continued until the vapour has been driven off. The terms of regulation 19 should be observed, and every pipe leading into the still should not only be disconnected, but also blanked off with a metal blank with a large indicator lip. The blanks should be firmly bolted with a properly made joint. The closing of cocks and valves should not be considered a satisfactory isolation. In addition, not only should the still be allowed to become cool, but suitable steps should be taken to ensure that the brickwork beneath is quite cool, so that a properly prepared still may not later be rendered foul. If, for any reason, tar and pitch stills cannot be dealt with as



hot stills, then they should be treated as under the following regulations for oil stills and closed tanks.

(b) *Preparation of Benzol and Oil Stills and Closed Tanks.*—Immediately the charge has been run off, the still or tank should be blown through with live steam, and afterwards opened and the steaming continued until the vapour has been driven off. The terms of regulation 19 should be observed, and every pipe leading into the still should not only be disconnected, but blanked off with a metal blank with a large indicator lip. The blanks should be firmly bolted with a properly made joint. The closing of cocks and valves should not be considered a satisfactory isolation. In addition, not only should the still be allowed to become cool, but suitable steps should be taken to ensure that the brickwork beneath is quite cool, so that a properly prepared still may not later be rendered foul.

2. *Ventilation.*—Stills or tanks should be thoroughly ventilated for a sufficient period to ensure as far as possible the removal of any gas or vapour.

(a) If the still has a bottom manhole of sufficient area and adequate top openings, natural ventilation may suffice, or the use of a windsail on a breezy day may more speedily cleanse the atmosphere.

(b) Where the bottom opening is of small dimensions, mechanical ventilation should be utilised either:—

(i) By introducing compressed air, the air being taken from a source which is free from noxious gas; the air pipe should extend to the bottom of the still to ensure removal of heavy gas or vapour and adequate circulation of air; (ii) by using a blower fan and trunk extending to the bottom or introduced at the bottom of the still; (iii) by using an exhaust fan or ejector and trunk extending to or introduced at the bottom of the still.

3. *Testing for Gas.*—After thorough ventilation the atmosphere should be tested by the insertion of a cage of white mice, which should be in a normal condition after five minutes' seclusion in the still. The mice should therefore remain in the still or tank so long as men are in the still, and their condition should be investigated at regular frequent intervals. If at any time before the conclusion of the test it is necessary for any person to enter a still or tank he must wear breathing apparatus and a life-belt, the free end of the line attached to which must be left with a man outside. The neglect of this precaution, even by a person who enters for the purpose of testing and certifying the still, is a breach of regulation 7.

4. (a) *Removal of Scale or Semi-Coked Pitch from Tar and Pitch Stills.*—In the case of tar and pitch stills which have been properly prepared as in recommendation 1, and which are properly ventilated according to recommendation 2, scale or semi-coked pitch may be removed by men who need not be required to wear breathing apparatus, provided that the vessel has been certified as safe to enter.

(b) *Removal of Sludge, Deposit or Scale from Benzol Stills, Oil Stills, or Closed Tanks.*—In the case of benzol stills, oil stills, tar stills which have not been steamed out when hot, and all closed vessels, the sludge, deposit, or scale should be considered as possible sources of gas or vapour, even though it may have been possible previously to certify a still containing such matter as being for the time free from danger. If men have to enter a still or tank to remove sludge, deposit, or scale they should be required to wear breathing apparatus and lifelines.

5. *Breathing Apparatus.*—For work in stills or tanks breathing apparatus with an inhalation tube should be used instead of absorbent masks or helmets. These masks or helmets are not suitable for use when the concentration of gas or vapour is high, and as the absorbent material requires changing at stated periods when in use, neglect to do this may render them valueless. For short distances inhalation tubes without artificially supplied air are usually practicable, but if necessary an air supply can be obtained by means of a bellows attached to the tube.

The committee urges members to adopt these recommendations, with suitable additions to meet local circumstances in framing their works rules.

This, states the report, is a highly satisfactory agreement and in its detail goes much beyond what is set out in the regulations.

The following types of canister, box, or army type of breath-

ing apparatus submitted by Siebe, Gorman and Co. have been tested and approved in accordance with the regulations subject to a definite specification:—"Purethra" C.G. Red coloured canister, for use in connection with acid gases, e.g., chlorine, sulphuretted hydrogen, and phosgene; "Purethra" A. Blue canister, in connection with ammonia only; "Purethra" C. Black canister, for use in connection with organic vapours, e.g., benzol, carbon tetrachloride, and trichlorethylene; "Purethra" N.F. Orange canister, for use in connection with nitrous fumes only. Approval is also given to types of self-contained breathing apparatus approved by the Mines Department for use in mines.

#### Fumes and Gases

In the section on fumes and gases it is pointed out that although reporting of accidents (including gassing cases) is not now required unless absence from work has lasted three days, no diminution is to be observed. As regards carbon monoxide, 118 accidents were reported (10 deaths), of which 25 (6 deaths) were due to blast furnace gas, 34 (1 death) to power gas, 26 (2 deaths) to coal gas, and 33 (1 death) to carbon monoxide from other causes. In the case of carbon dioxide there were 10 cases (2 deaths). Gas generated from a cargo of sugar in the hold of a ship accounted for 4 of the cases, cleaning out a lime kiln for 3 (including 2 rescuers). There were 2 fatal cases, 1 from cleaning out a scrubber and 1 from the fumes from burning ashes. Sulphuretted hydrogen gave rise to 4 cases (no deaths) as compared with 4 fatalities in 1924. Two of the cases were due to sewage, and 1 to escape from a sulphate of ammonia plant in a gasworks. Reference was made last year to trouble from the evolution of minute quantities of sulphuretted hydrogen from the acid house in the spinning of artificial silk, setting up conjunctivitis with gritty feeling in the eyes, headache, etc. Even with local exhaust ventilation, escape of minute quantities is difficult to prevent.

Sulphur dioxide was responsible for 3 accidents (1 death). No fatalities occurred in connection with chlorine, though 12 accidents occurred. Four of the cases occurred in alkali works in the manufacture of chlorine, 4 from its use in dye works, and 1 in a paper mill. Ten accidents (2 deaths) were due to nitrous fumes. Repairing of sulphuric or nitric acid plant (Glover or Gay Lussac towers, etc.) accounted for 3 cases (2 fatal), fumes from broken or leaky containers for 3, escape from vats for 3, and fumes exhausted from the nitric acid plant in one case were carried by the wind to where a man was working. Five accidents (none fatal) were reported in connection with ammonia. Accidental disconnection of tubing from a cylinder accounted for 2 cases, fumes blown to where a man was working loading ice for 1, and 1 to the breaking up of two cylinders which were supposed to be empty. Under the heading of benzol, naphtha, 3 cases (1 fatal) appear. The fatal case was due to getting inside a mixing tank containing naphtha to recover an iron rod which had dropped in, and the 2 non-fatal, 1 to fumes of benzol from a rubber-spreading machine and the other to cleaning out a tank which had contained petrol and 25 per cent. benzene. The fatal case referred to, died as a result of burns from the continued action of the naphtha on the skin under the influence of heat from an "electric cage" which had been applied before removal of the clothing. Two cases (1 fatal) were due to poisoning by arsine contracted in the treatment of zinc flux containing a small proportion of arsenic residues with hydrochloric acid.

Gases and vapours other than those mentioned above were responsible for 35 cases (3 deaths). Nickel carbonyl accounted for 17 cases (1 death). They were nearly all due to slight escape of this highly toxic gas from a fractured pipe and leaks in joints subsequent to general repair and cleaning of the plant. Five cases were due to trichlorethylene, 2 (1 fatal) from painting the inside of a vat in a brewery with an enamel containing it. Fumes from a paint containing naphtha in a confined space accounted for 2 cases. Two cases of conjunctivitis were due to emptying dimethylsulphate in a bucket which leaked and spilled the contents on the floor. Fatal cases from the irritant action of this material are known, due to the corrosive action on the respiratory tract.

#### Lead Poisoning

Some very important figures are given in a table dealing with poisoning by various metals (lead, mercury, etc.), and by various compounds such as carbon bisulphide, benzene, aniline, etc. There were 326 cases of lead poisoning (13

deaths). In a passage in this connection it is pointed out that draft regulations to apply to the use of lead paints in painting of vehicles were prepared and issued in conformity with the recommendations of the Paint Committee's Report of 1923. Apart from the danger of lead poisoning in this industry, paint spraying—in the motor-car industry especially—has been enormously developed, fortunately with the use of leadless colours as the safest and wisest precaution. The excipients of the cellulose coating—amyl acetate, butyl acetate, methylated spirit, a proportion of benzol and turpentine—require attention in the way of exhaust ventilation and fire prevention, but they do not carry with them the same risk to health as if lead colours were used.

The number of cases of lead poisoning among house-painters and plumbers which came to the knowledge of the Department (notification is not obligatory) was 100 (12 deaths). Of these, 88 (9 deaths) occurred to house-painters, and 12 (3 deaths) to plumbers. House-painting, therefore, is shown to be easily first of the occupations giving rise to lead poisoning in this country. Comparison of these with the total cases of lead poisoning contracted in factories (326) shows that among house-painters in 1925 the cases were twice as severe as factory cases, the amount of chronic poisoning was four times as great, and incidence of the severe symptom of paralysis also was greater.

As regards carbon bisulphide poisoning two cases occurred in the cold cure process in the rubber industry and the other in the manufacture of artificial silk. Shortly afterwards some 12 men similarly employed in artificial silk were examined and in several of them symptoms of absorption of carbon disulphide were noted. In the factory in question considerable attention had been given to the question of ventilation, but at the machines where carbon bisulphide was used this had not been sufficiently locally applied. This has since been remedied. Other effects on health in this very important new industry have been noted—*e.g.*, irritation of the eyes from minute proportions of hydrogen sulphide gas present in the air in spinning rooms, and effects on the skin from the acid used in spinning.

#### Aniline Poisoning

Thirty-one cases of aniline poisoning (1 death) occurred, 25 in chemical works where aniline compounds or intermediate products, such as dinitrobenzene, etc., are manufactured, and six in bleaching, dyeing, and printing works. In two of the cases (one fatal) in chemical works, tumours of the bladder led to notification. It was not quite clear in either of them that employment in the occupation had induced the growth. Several of the cases showed the rapid way in which aniline, either as a liquid (in the form, *e.g.*, of aniline oil) spilled or splashed on to the clothes, or falling as dust (*e.g.*, in the packing of paranitranilin), is absorbed by the blood directly from the skin. Arrived there, the aniline causes changes in the blood, and prevents the proper supply of oxygen to the tissues. Thus, Dr. Henry reports on one man who prepared and diazotised dianisidine in a print works; he suffered from dyspnoea, vomiting, and unconsciousness for half an hour, while another had a similar attack from contact with paranitranilin.

There were six cases of arsenical poisoning, five of mercurial poisoning, and 54 of chrome ulceration, fortunately with no fatalities.

In the letter covering the report, the chief inspector, Sir Gerald Bellhouse, reviews the state of industry. The artificial silk manufacturing industry is reported as having been busy. The beet sugar industry is developing rapidly and nine factories were working last year, while five others were in course of construction. Reference is made to the production of a new stainless steel; and in the North Eastern division there has been development in tar distilling, while "the synthetic ammonia plant referred to last year has been duplicated."

#### British Columbia Phosphates for Prairie Soils

BRITISH COLUMBIA may soon produce phosphates in large quantities for the enrichment of prairie soils, states the Hon. William Sloan, Minister of Mines, who announces the discovery of large deposits of the valuable fertilising mineral in the East Kootenay district. It is believed that the Consolidated Mining and Smelting Co., the largest concern of its kind in Western Canada, will become interested in the deposits.

### British Association of Chemists

#### A Further Reference to the "Commercial Side"

IT may be a matter of coincidence, but soon after an article upon this subject was communicated to the Press an increased number of advertisements offering this type of post to chemists appeared, and in various other ways the Association has become aware that facilities in this direction are becoming increasingly available.

In an address to the London Section of the Society of Chemical Industry some months ago, Mr. Garland emphasised the importance of commercial knowledge to the chemist, and, indeed, suggested that without it no chemist in industry could arrive at great success. Undoubtedly, leaving out of account the increased scope for employment to be found in this direction, the chemist will do well to study carefully the practice in commercial matters. Even where a chemist may not wish to remain on the commercial side, he would do well, where opportunity offers and if unemployed, to accept such a post for the sake of experience. The chemist suffers no loss of status by entering the commercial field; if he has talent in this direction, both science and commerce will benefit by this combined activity. It is significant that technical managers, who at their best combine in equal proportions the faculties of science and commerce, are the first to recognise the beneficial effect of the employment of the chemist in the commercial sphere.

The many new outlets for the chemist's activities have lately been well illustrated in an article which appeared in an American publication, *Printers' Ink*, entitled "Put the Chemist on Your Advertising Staff." It showed how technical knowledge could be employed in the service of advertisement. This department of advertising is now being developed in this country, and a chemist who could combine with his technical knowledge a knowledge of how to write advertisements might possibly find it remunerative. As with most other occupations, advertising becomes steadily more specialised and more scientific, and this should be an additional incentive to the scientifically trained individual to take a share in it; but there is still room for much improvement. It is quite common to see advertisements which depict the interior of laboratories full of apparatus of most antiquated and sometimes even fabulous pattern. It seems wrong that up to now the chemist has not bestirred himself to correct this state of things.

The chemist must rid himself of the idea that commerce is beneath him. In the early days of the application of science to industry the cleavage was sufficiently sharp, but science and commercial enterprise become more closely connected every day. Each has still much to learn from the other, and the entry of the chemist into the commercial sphere will, more than anything else, help to wed these two forms of adventure and enterprise.

R.

#### New China Clay Association

A SUCCESSFUL conclusion has been reached in the efforts which have been made to establish a comprehensive China Clay Association. Associated China Clays, Ltd., registered office, The Old House, St. Austell, Cornwall, was registered on August 30, with 100 members, each liable for £10 on winding-up, to ensure and accelerate the better distribution of China Clay among the customers who purchase clay from members of the company, to deal in or act as agents for the sale or purchase of China Clay of all kinds, etc. The first members of the board in which the management is vested are: T. M. Stocker, St. Austell; J. S. Lovering, St. Austell; E. J. Hancock, St. Austell; W. Wedlake, St. Austell; J. Hoyle, St. Austell; A. J. Perry, St. Austell; and S. B. Perry, St. Austell. The board is to consist only of members of the company or of directors of any companies which are members. Except with the consent of the board no member shall be qualified to hold office as a director who is the owner of any business producing China Clay in respect of which he has not entered into a membership agreement, and who holds a controlling interest in any company, or is a member of any firm producing British China Clay which is not a member of the company or holds any office in such company or firm.

## Chemical Problems of River Pollution

### Third Report of Standing Committee

THE Ministry of Agriculture and Fisheries has issued a pamphlet entitled "River Pollution and Fisheries" (H.M. Stationery Office. Pp. 33. 6d.), being a non-technical report on the work during 1925 of the Standing Committee on River Pollution.

In the covering letter addressed to the Minister of Agriculture and Fisheries the committee say: "The further we delve into the problem of pollution, the more complex does that problem appear. On the one hand, there is the difficulty arising from the number of interests involved, such as industry, water supply, water power, fisheries, and general amenities. On the other hand, we are constantly faced with the lack of scientific knowledge necessary to devise a method of dealing with a particular effluent. The remedies would appear to be, first, the creation, as recommended by the Royal Commission on Sewage Disposal, of some sort of central authority to hold the scales between the various interests concerned, and to be charged with the preservation of one of our greatest national assets—pure water; and secondly, the appointment of sufficient technical staff working under such an authority, to elucidate not only in the laboratory, but also by works experiments at the source of pollution, the scientific questions which, at present, have no answer.

#### Disposal of Milk Wastes

The report opens with an account of the condition of various rivers. Particular attention has been paid to the amount of dissolved oxygen, to the discharge of sewage and works effluents, etc. An investigation of the disposal of liquid waste from the handling of milk in the manufacture of milk products in Holland was made jointly by the Ministry of Agriculture and Fisheries, the Ministry of Health, and the National Association of Creamery Proprietors and Wholesale Dairymen. There are in Holland nearly 900 factories dealing with milk, the average amount dealt with per day varying from 100 to 10,000 gallons, and the methods employed for dealing with the liquid wastes are somewhat varied. The methods of dealing with dairy waste in Holland may be classed as (1) dilution; (2) land treatment or irrigation; (3) lime precipitation followed by septic tanks and percolating filters; and (4) the activated sludge process on a laboratory scale.

Dilution was not generally effective, even in the case of large canals, for, although these are of large volume, they are almost stagnant, and so do not afford sufficient dilution to be effective. Land treatment is only effective where a large area of suitable soil is available, or where the refuse is dilute in character. Percolating filters are effective if proper attention is given to their construction and management. The activated sludge process has only been tried on an experimental scale, but working scale experiments are now in progress, and are yielding very promising results. This investigation is important, in view of the tendency in recent years for the dairy industry in this country to concentrate operations in central factories.

#### Coal Washery Waters

In a discussion on the sedimentation of coal washery water it is pointed out that the effluents from all the various types of coal-washery plants contain varying amounts of suspended matter, which consists principally of finely divided coal and shale and clay. The usual method of removing this matter is to allow the water to stand in large tanks or ponds, when a considerable proportion of the solids settle. This method has certain drawbacks. Attention has therefore been directed towards the discovery of some means of hastening the settlement. The Lancashire and Cheshire Coal Research Association have carried out a considerable amount of laboratory research work from which very promising results have been obtained. Experiments with lime as a coagulant had already been carried out by the Allerdale Coal Company, of Workington, but from the results obtained by the Association it has been established that various other substances, both organic and inorganic, have a more or less marked coagulating effect when added in small quantities and in such a manner that thorough mixture is obtained without undue agitation. It has also been established that the inorganic matter originally present dissolved in the water has a pronounced effect upon the finer particles, which are those requiring the longest time to settle. The practicability of this method of treating coal-

washery waters has not as yet advanced beyond the laboratory stage, but it is hoped that it will be possible to carry out a works experiment in the near future.

The rapid development of the manufacture of sugar from beet in this country brings with it the risk of a new form of pollution which may have serious results. Every beet-sugar factory of necessity employs large quantities of water. This source of pollution is being carefully studied, in order that it may be controlled from the outset.

#### Effects of Tar Products on Fish

The report mentions that two papers on the effect of tar products upon fish have been translated, and these are summarised on account of their exceptional interest. The first, by Hein, appeared in 1906, "On the Effect of Coal Tar on Fish and some Invertebrates." The effects of some watery extracts of coal tar on fish were determined. He found that in all groups of animals examined, tar acted as a nerve poison. Concentrations of the order of 1 part of tar in 80,000 of water usually proved fatal to fingerling trout in 18-20 hours, larger trout being more resistant. Weaker solutions produced the same reactions, and test fish moved off in search of unpolluted waters. Other species of fish (barbel, gudgeon, etc.) showed the same symptoms as trout, but were better able to withstand the poisonous effect.

The second paper, by Steinman and Surbeck, "On the Toxicology of Fishes," appeared in 1920. The effects of a large number of different tar products, such as naphthalene, benzene, phenol, toluene, etc., on some nine species of fish were determined. The authors stated that fish moved away to purer waters and avoided the polluted zone. They point out that it is incorrect to regard the total volume of a large river, which already receives effluents from various factories along its banks, as the diluent, in deciding what volume of some new effluent may be turned in with safety. Further, they emphasise the need for caution in fixing dilution limits for a substance. Thus, suppose a regulation permitting one substance to be present to the extent of 1 part per 1,000. What is now the position, if there are several factories along the river all turning in the same effluent? Each individual can turn in an effluent containing 1 part per 1,000, and even if the fishery be completely destroyed by the united effect of the several factories, each factory is itself within the law.

A further point that emerged from these experiments was that of the toxicity of substances that are held to be insoluble. In chemistry, especially in technical chemistry, substances are frequently held to be insoluble when only minute quantities, say, a few milligrams per litre, go into solution. Such substances have frequently been held to be harmless. Experiments showed, however, that these so-called insoluble substances might be fatal to fish. Finally, the authors drew attention to another very interesting point, namely, the resistance of the fry of trout and char to poisonous substances. They showed that very young fry withstood the action of phenol and of xylol and toluene mixtures for hours, whilst older fish died in these solutions in a few moments. They pointed out that the view advanced "that the destructive action increased as the weight of the individual decreased" was incorrect.

#### "Calcium Phosphate in Bread"

To the Editor of THE CHEMICAL AGE.

SIR,—We refer to your issue of THE CHEMICAL AGE, dated the 28th ult., on page 205, under the heading "Calcium Phosphate in Bread." The writer of the article stated that all calcium phosphate contains calcium sulphate (plaster of Paris). We suggest that such a statement is liable to be misunderstood. A few years ago acid calcium phosphate was heavily adulterated with calcium sulphate. To-day there is on the market an unadulterated acid calcium phosphate free from calcium sulphate. Our firm is actually supplying a very large number of consumers with such a phosphate, manufactured by Albright and Wilson, Ltd., of Oldbury, and sold under the name of "Ibex."—We are, etc.,

C. CHRISTOPHERSON AND CO.

6, Lloyds Avenue, E.C.3.

September 4.



## Smoke Abatement Exhibition

### Interesting Display at Birmingham

UNDER the auspices of the Smoke Abatement League of Great Britain, the Universal Smoke Abatement Exhibition was opened on Monday at Bingley Hall, Birmingham, and it will remain open until September 18. The exhibition is a practical demonstration of the means of smoke abatement at the disposal of manufacturers and householders. The scope of the exhibition is extremely wide, and important contributions are made by the gas, electrical, and chemical industries, and by scientific research bodies. From September 7 to 10 conferences were held for the consideration of problems of smoke abatement in relation to industry, and housing, as well as to the question of the smokeless production of heat and power; and lectures were also arranged by the electrical and gas industries.

Councillor Will Melland, of Manchester (chairman of the Smoke Abatement League), presided at the opening ceremony. The primary object of the exhibition was, he pointed out, to show users and producers of power, light, and heat, such apparatus and models of apparatus as would help them in the economical pursuits of their objects, and also to assist, from the point of view of the public, in combating the terrible smoke evil. He hoped the exhibition would do much in removing public apathy with regard to the problem. The Lord Mayor of Birmingham, Alderman Percival Bower, in opening the exhibition, said although we never liked interference, whether it be from the State or Local Government, we certainly had reached the stage when we were able to appreciate fully the factors responsible for air pollution. Its detrimental effect upon public health was obvious; it led to industrial inefficiency. On the other hand, pure air and sunshine led to a reduction in the mortality rate.

### The Exhibits

The results of scientific research are set forth on the stand of the Smoke Abatement League. One is by H.M. Fuel Research Board, another from the University of Birmingham, Department of Oil Engineering and Refining (Professor A. W. Nash), and the Coal Mining Research Department (Mr. Ivor Graham). A large amount of work has been done in low temperature carbonisation at the Fuel Research Station, and the results are given; also diagrams of the latest vertical retorts, together with the Gray-King low temperature assay of coal—an apparatus so designed as to give results from which the experimenters can deduce the behaviour of a coal on a works scale. It is pointed out that the question of the oil products is one necessitating a large amount of investigation. The aim of the Fuel Research Board is to determine whether these oils can be worked up to give valuable products. The Board has carried out a series of investigations at temperatures varying from 400° to 700° C. in 50° steps; the whole of the by-products were collected, and the results carefully examined. Then the tar was examined exhaustively by extractions and refinings, to separate, if possible, any valuable compounds which may exist in low temperature tar. The Fuel Research Board will shortly issue a report upon these investigations; meanwhile, further investigational work is being done. The Department shows examples of low temperature smokeless fuel, made in vertical retorts, continuous working.

### Experiments in Berginisation

On the berginisation of coal some very interesting examples of work done are shown by the Oil Research Department of the Birmingham University. For dealing with this problem it is stated that a very large experimental plant is now being installed at the Government Research station, Greenwich. From the Coal Mining Research Department of the University of Birmingham results are displayed of experimental work in connection with the liquefaction of coal by hydrogenation under high pressure. Coal, of various kinds, has been treated in rotating autoclaves at about 400° C. and under hydrogen pressures up to 2,400 lb. per sq. inch. The oil yield is shown (together with the samples of coal) varying from 24 per cent. to 40 per cent. of the original coal, this being equivalent to 50 to 85 gallons per ton.

A model boiler house is a notable exhibit; it consists of a number of contributions by individual firms—about 20—and efficiency, fuel economy, and labour-saving are claimed,

as well as absence of smoke, grit and noise. It is demonstrated that pulverised coal can be applied on modern lines to the firing of boilers and for metallurgical furnaces. A motor-driven pulverising unit, of capacity 500 lb. of coal per hour, is shown on the stand of Albert Herbert, Ltd., Coventry. On the water tube boiler John Gordon and Co., Ltd., show in operation the Duplex Mono Combustion Recorder. This records both CO<sub>2</sub> and unburnt combustible gases, such as CO and C, on one chart. Another interesting feature is the Rheograph V-Notch water flow recording instrument of the recording and disintegrating type for measuring boiler feed water and engine condensate.

On the stands of Geo. Kent and the Industrial Combustion Engineers, Ltd., there are various types of flow meters of interest to the chemical engineer. There is a specific gravity recorder which affords compensation for temperature changes. Avery's weighing and registering instruments are of interest. A Lea coal meter (Lea Recorder Co., Ltd., of Manchester) gives the total quantity of coal actually as fired by the volumetric principle.

A pressure filter for the purification of sedimentary water for boiler feed supply and manufacturing purposes is exhibited by the Paterson Engineering Co., who also show a lime soda plant for the treatment of hard boiler feed water supply, its capacity being 1,500 gallons per hour. This installation is shown under working conditions. Chance Bros. show a valve for use with reversing regenerative furnaces. Another softening plant is exhibited by the Kennicott Water Softener Co., Ltd., Wolverhampton.

In a large exhibit by Midland gas undertakings the facilities offered for the employment of smokeless fuels are emphasised, and the electrical undertakings also point forcibly to the efforts they are making in the direction of the ideals of the Smoke Abatement League. The Woodall-Duckham Vertical Retort and Oven Construction Co., London, demonstrate that gas-works coke, suitably prepared, provides a solid smokeless fuel for domestic purposes. There is a scale model of a 50-ton per day T.I.C. tar distillation plant in which tar is distilled in contact with molten lead. Coke drying at the rate of 100 tons per hour, down to 5 per cent. moisture, is demonstrated by the same company in a model of a Carpenter Centrifuge.

### Salters' Institute Fellowships

THE following awards for the year 1926-27 have been made by the Salters' Institute of Industrial Chemistry and approved by the Court of the Company:—

Fellowships have been renewed to Mr. H. S. Pink, University College, Nottingham, and University of Oxford (Fellow, 1924-25, 1925-26), at the Massachusetts Institute of Technology; Mr. V. E. Yarsley, Birmingham University (Fellow, 1924-25, 1925-26), at the Polytechnic, Zurich; and Dr. R. Campbell, Armstrong College, Newcastle-upon-Tyne, and University of Oxford (Fellow, 1925-26), at the Department of Chemical Engineering, University College, London.

Fellowships have also been awarded to Mr. E. A. Bevan, East London College, University of London; Mr. R. M. Deanesly, University of Oxford; Mr. R. Edgeworth-Johnstone, College of Technology, University of Manchester; and Mr. H. B. Spalding, University of Oxford.

The Salters' Institute has also awarded fifty-one grants-in-aid to young men employed in chemical works to facilitate their further studies.

### Soap Manufacture in India

IN our issue of September 4, in a reference in our "Indian Chemical Notes" to the vegetable oil industry in the Punjab, it was stated that Mr. John Brewis was appointed by the Local Government for the purpose of preparing the valuable report alluded to. This was not strictly correct. The Local Government approached the firm of George Scott and Son (London), Ltd., and it was this company that undertook an exhaustive survey of the subject, and sent Mr. Brewis to India as their representative to study the conditions, collect data, etc., all of which was done under the supervision of the company. The report is a most thorough and exhaustive piece of work, and reflects credit on both the company and the representative they selected.

## The Tensile Strength of Iron

### Effect of Occluded Hydrogen

In the current issue of the *Proceedings of the Royal Society* (Series A, Vol. 112, No. A760, pp. 182-195) L. B. Pfeil has a valuable paper on the embrittling of iron and steel by acid, a subject to which much attention has been directed in recent years. It is generally considered that the embrittling is due to the occlusion of hydrogen by the metal.

This subject is of particular importance in those branches of the iron and steel industry where acid is used to remove oxide from the surface of the metal before tinning, galvanising, wire-drawing, etc. There is also some reason to suppose that certain boiler failures may be connected with the occlusion of hydrogen by the metal. A large number of investigations dealing with various aspects of the subject have been published, notably by Longmuir, Andrew, Fuller, Coulson, Parr, Watts and Fleckenstein, Langdon and Grossman, and Edwards. In the above-mentioned papers interesting quantitative data are available on the effect of hydrogen on the mechanical properties as determined by bend tests, impact tests, alternating stress tests, and the Erichsen-test. (See bibliography in original paper.)

The experimental work carried out during this research may be divided into three sections:—(1) Tests on iron in the normally finely crystalline condition. (2) Tests on single iron crystals. (3) Tests on the boundary between two large crystals.

It has long been known that ferrous metals embrittled by pickling recover their normal properties on standing, and for this reason quantitative tests can only be satisfactory if this time factor be taken into account. It was decided,

All the carbon, however, was removed by a prolonged annealing at 750° C. in hydrogen gas, leaving iron of the following composition:—C, nil; Si, 0.064; S, 0.034; Mn, 0.46; P, 0.020 per cent. Some of the material was tested in the fully annealed, finely crystalline condition as it left the furnace, while the remainder was converted into single crystals by a method adapted from that devised by Carpenter and Elam for converting finely crystalline aluminium into single crystals.

Some preliminary tests were carried out to determine the most suitable conditions for carrying out the tensile tests during pickling. The variables taken into account were: (1) The strength of the sulphuric acid electrolyte; (2) the strength of the electrolysis current; (3) the time the current passed before beginning the loading; (4) the diameter of the test pieces; (5) the rate of loading; and (6) the temperature at which the test was made.

These various factors are discussed, and tables are given in the original describing the results of tests on (a) finely crystalline aggregates during pickling at 25° C.; (b) the same at 30°-50° C.; (c) after pickling; (d) single crystals tested in normal manner; (e) single crystals tested during pickling at 25° C.; (f) single crystals annealed for one hour after machining and broken during pickling at 25° C.; (g) test pieces consisting of two or more crystals in the parallel portion broken before pickling at 25° C.

#### The Results of the Investigation

The author's results may be summed up as follows:—Occluded hydrogen has a remarkable weakening effect on the inter-crystalline boundary. This applies not only to the boundaries between very large crystals, but also to the boundaries between the very minute crystals of which ordinary iron consists. The strength of the boundary between two single crystals has been shown to be about 8½ tons per square inch, and of the boundary between very small crystals about 17 tons per square inch. It is probable that this marked difference is due, not to any real variation in the strength per unit area, but to the difference in the ratio between actual area of fracture and the cross-sectional area of the test piece in the two cases. This ratio is certainly much greater in the case of the aggregate than it is in the case of the two large crystals.

It may be mentioned here that a few experiments which have been made indicate a progressive fall in boundary strength as the crystals grow larger. Since the tensile strength of iron obtained in the normal manner is nearly constant over a considerable range of crystal sizes, the ratio between tensile strength, as normally obtained, and boundary strength, as obtained by tests during pickling, will be found to vary with the size of the crystals in the specimens tested.

In addition to its effect on the boundaries, hydrogen decreases the cohesion across the cubic cleavage planes, a pull of 5 tons per square inch applied at right angles to the cleavage plane being sufficient to cause separation. Occluded hydrogen does not prevent deformation by slipping on the icosa-hedral planes of the iron crystal. Judging from the behaviour of the single crystals during these tests, it seems improbable that the hydrogen has even any important effect on the resistance to movement along the slip planes. In a single iron crystal certain crystallographic planes or directions are particularly liable to damage during machining operations. The surface cold working is not evident in an ordinary tensile test, but becomes very evident when the test is made during pickling.

#### The Effect of Temperature

The effect of hydrogen on the finely crystalline iron is very much less marked at temperatures a little above room temperature. Under these conditions the crystal boundaries are not so greatly weakened. Fracture takes place mainly through the crystals after they have drawn down by slipping, but the point at which fracture occurs is determined by cracks which form as a result of a limited cleavage and intercrystalline failure. The cracks probably originate in those crystals so set at the surface of the test piece as to prevent a cleavage plane at right angles to the stress, these being particularly liable to fracture at low stresses. The minute notches so produced

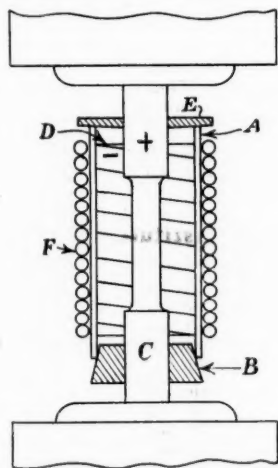


FIG. 1.

therefore, to carry out the tensile tests in the first instance while the specimens were actually immersed in the acid. Simple immersion was not satisfactory, for the corrosion occurring during the test greatly decreased the accuracy of the results. Electrolytic pickling was used throughout the experiments to be described, for by this means corrosion was entirely prevented.

#### The Apparatus Employed

The simple apparatus which was employed is illustrated in Fig. 1. A 2½-in. length of 1½-in. diameter glass tube (A) was closed at the lower end by a rubber bung (B), through which passed one end of the test piece (C). A 1-in. diameter coil of platinum wire (D) within the glass tube formed the anode, and the test piece was made the cathode. The upper end of the test piece carried a rubber disc (E), a loose fit on the top surface of the glass tube to prevent the acid spray from damaging the testing machine. In some experiments a coil of small diameter rubber tubing (F) was wound round the glass tube and carried a stream of cooling water. With the aid of a funnel with rubber tube attached the sulphuric acid electrolyte was introduced after setting up the apparatus in a 10-ton Buckton tensile machine.

The material employed was ½-in. diameter mild steel rod.

lead to large cracks which, decreasing the effective cross-section of the test piece, cause a low value to be recorded for tensile strength.

Unless the pickling were continued during the stressing the effect of the hydrogen was scarcely noticeable in these tests. This indicates how limited in value is the tensile test as a means of investigating mysterious failures which sometimes occur in steel structures for which occluded hydrogen is suspected as being responsible.

A short bibliography of previous work is given with the original paper.

## Employers and Workers Unite

### A New Phase of Industrial Trade Unionism

AN interesting experiment in the creation of a definite bond between employers and workers engaged in a single business undertaking is announced by the Manchester Guardian and Evening News, Ltd., the company owning the morning and evening journals named. A Manchester Guardian and Evening News Society has been formed consisting of the adult permanent full-time employees engaged in the production and distribution of the company's newspapers. Without sacrificing their membership of ordinary trade unions, the members of the society will form a corporate "house" trade union, with a definite responsibility to promote the efficiency of the company's business, and a pledge to have all disputes settled by arbitration instead of by strikes. In the matter of wages, tenure of office, settlement of claims, pensions, etc., the members of the society have definite guarantees. The company, in return, have the valuable guarantee of the workers' united interest in the prosperity of the concern and their pledge to maintain the uninterrupted service of the company's newspapers. Both the company and the society, while belonging to their respective federations and trade unions, pledge themselves not to enter into any obligations in conflict with their liabilities the one to the other.

How far this scheme is likely to furnish a model for other businesses and to recover the true collective spirit in industry it is not possible yet to say. But in this particular instance it would be a surprise if it did not work well. For it is merely reducing to terms what does in substance already exist. Under the inspiration of Mr. C. P. Scott the *Guardian* office has long been recognised as one of the most notable clubs or brotherhoods of workers in the newspaper industry; in the words of the address which all the employees, without exception, joined in presenting to him on his seventieth birthday, "a fellowship of work," based on loyal co-operation, mutual confidence and respect, and high ideals of service. It is simply this spirit, which Mr. Scott has inspired in all his colleagues, from the highest to the lowest, that the new agreement now converts into a formal pact. Whether the spirit produces the agreement or the agreement produces the spirit, the scheme now announced is creditable to its authors on both sides. It is an interesting concrete example of employers and workers recognising the common ends for which they labour together, and replacing sectional divisions and antipathies by a large constructive co-operation. It recognises, too, a joint responsibility for the individual businesses in which both parties are concerned. The influence of such an example is bound to be good in emphasising the constructive and progressive side of trade unionism and discouraging the negative and divisive influences of its more extreme forms.

### The Individualist Bookshop, Ltd.

ARRANGEMENTS for the opening of the Individualist Bookshop Ltd., are now complete. Premises have been secured at No. 40 Marsham Street, Westminster. The decorators are at work in view of the opening of the shop for business at the end of the present month. It is hoped to organise from this convenient centre a campaign on behalf of Individualism, which will give a completely new tone to the political discussion of the coming winter. The Individualists propose to organise a monthly luncheon, and among other schemes that are well advanced is a novel plan for a Reading Circle which should prove very popular.

## German Dye Industry Statistics

H.M. CONSUL GENERAL at Cologne has forwarded to the Department of Overseas Trade the following extract from the *Deutsche Bergwerks Zeitung* of recent date dealing with the German dye industry on the world market.

The total annual German exports of dyes and dyestuffs amounted before the war to 260 million kgs. at a value of 300,000,000 marks. At that time, people spoke of a world monopoly of the German industry on the dye market. This was not quite correct as, even at that time, Germany did not possess a complete monopoly, although between 75-80 per cent. of the world requirements in dyes were covered from Germany and in certain products it may even have possessed a real monopoly, due to its technical superiority. As in many other things, the world war brought about fundamental changes. In England, France, Italy, Japan, and the United States of America, in the course of the war, new concerns in the chemical industry were established, partly with the help of considerable state funds. After the war these industries were, of course, not content to cover the requirements of their own countries in dyes and dyestuffs, but tried to find new markets and thus large markets were lost to Germany. The effects of these proceedings are reflected in the German export statistics for dyes, as seen in the following tables:—

	1913. Kgs.	1923. Kgs.	1924. Kgs.	1925. Kgs.	1st half-year. 1926. Kgs.
Aniline, tar and sulphur dyes ..	64,288,000	28,894,500	22,028,900	17,364,600	10,140,700
Alizarine, Alizarine dyes from anthracene	11,040,000	895,900	1,331,000	2,185,200	1,184,300
Indigo, Indigo - carmine ..	33,353,000	3,764,200	4,324,900	14,868,700	6,968,700
Zinc white, lithopone	34,445,000	14,731,600	11,607,800	22,468,200	13,458,700
Ultramarine ..	3,729,700	1,178,300	861,500	1,227,700	495,000
Pure and mixed Blue, Lake Dyes, Chrome Green, Zinc Green	2,726,500	1,831,200	1,404,400	1,439,800	948,300

The following table shows the export of aniline, tar and sulphur dyes to the principal markets.

	1913. Kgs.	1923. Kgs.	1924. Kgs.	1925. Kgs.	1st half-year. 1926. Kgs.
British India ..	3,823,000	2,893,700	1,961,700	2,251,600	1,093,400
China ..	8,469,100	7,673,100	6,866,000	1,248,200	661,700
Japan ..	3,506,000	3,931,800	1,537,300	733,800	774,400
Russia ..	1,098,000	1,259,000	1,414,300	1,770,300	1,431,300
Great Britain ..	11,015,800	435,400	369,700	581,900	482,900
United States ..	13,854,700	373,900	242,200	681,700	353,200

The export of indigo and indigo carmine shows similar signs of development:—

	1913. Kgs.	1923. Kgs.	1924. Kgs.	1925. Kgs.	1st half-year. 1926. Kgs.
China ..	21,360,000	2,788,100	2,965,000	12,191,800	5,066,300
United States ..	3,461,000	?	2,700	52,700	9,600
British India ..	323,900	106,300	93,500	251,600	283,100
Dutch Indies ..	953,500	66,700	131,700	374,600	169,300
Japan ..	821,100	149,400	154,800	487,000	493,300

The export of oxide of zinc (white zinc) and lithopone, on the other hand, shows other characteristics:—

	1913. Kgs.	1923. Kgs.	1924. Kgs.	1925. Kgs.	1st half-year. 1926. Kgs.
Great Britain ..	10,170,400	2,061,600	1,398,200	5,207,600	3,000,800
Netherlands ..	4,003,600	1,716,700	1,509,900	4,704,300	3,204,800
Sweden ..	2,125,600	2,649,300	2,450,800	2,471,700	1,173,300
Switzerland ..	1,096,500	859,200	600,400	563,300	642,400

On the whole, according to the figures for the first six months, the current year promises a better result than last year, but, in spite of it all, the total sale of dyes, even if the expected improvements in the various markets set in, will still fall considerably short of pre-war figures. There can, therefore, be no question of a world monopoly or even a monopoly in the home market for German dyes. The following table of imports illustrates the competition with which German industry has to contend:—

	1913. Kgs.	1923. Kgs.	1924. Kgs.	1925. Kgs.	1st half-year. 1926. Kgs.
Aniline, tar and sulphur dyes ..	2,576,600	199,500	330,300	1,576,100	1,425,600
Alizarine, Alizarine dyes from anthracene	602,800	3,900	8,100	37,400	158,500
Indigo, Indigo - carmine ..	61,300	8,200	18,200	59,900	132,500
Zinc white lithopone	8,174,500	109,300	428,100	275,800	1,269,000
Ultramarine ..	89,800	—	2,000	5,900	12,500
Pure and mixed Blue, Chrome, Green, Zinc Green ..	88,800	35,200	50,800	108,700	36,300



## From Week to Week

MR. A. W. HAWKES, since 1923 vice-president of the General Chemical Co. of New York, has retired from this post to occupy a similar one with the Congoleum-Nairn Co., Inc.

AT THE GOTHAM GYPSUM MINES last Saturday, Alfred Sheppard, aged 39, of Cropwell Bishop, was removed to the Nottingham General Hospital suffering from injuries to the head believed to have been caused by his being struck during blasting operations.

AT THE GAS LIGHT AND COKE CO.'s YARD at Nine Elms Lane, Battersea, Harry White, a works foreman, whilst completing the work of laying a large main across a reservoir, fell into a tank and was drowned. At the inquest at Battersea, on Wednesday, a verdict of accidental death was recorded.

CAPTAIN ALFRED LOEWENSTEIN, chairman of the Cellulose Holdings and Investment Co., and a director of the Barcelona Traction Light and Power Co., is reported to have placed \$50,000,000 at the disposal of the Belgian Government, without interest, for a period of at least two years, to help the country to surmount its financial difficulties.

THE GOVERNORS OF THE WIGAN MINING AND TECHNICAL COLLEGE have obtained the Board of Education's sanction to proceed with extensions to the college premises at a cost of £32,000, this sum having been allocated to the college for the purpose by the Central Committee of the Miners' Welfare Fund. The new additions will include laboratories and class-rooms, and a further £5,000 will be available later on for equipment.

RECENT WILLS INCLUDE: Mr. William Love, of Lochwinnoch, Renfrewshire, sometime managing director of the Broxburn Oil Co., Ltd., £53,044.—Mr. Evan Jones, J.P., of Trimsaran, Kidwelly, lately chairman of Metallic Chemicals and other companies, £357,437.—Mr. Charles Paxton Markham, of Chesterfield, chairman and managing director of the Staveley Coal and Iron Company and the Parkgate Iron and Steel Company and other companies, £611,305. All his fortune was left to his wife.

THE ORKLA PYRITES PRODUCING CO., of Norway, and the Rio Tinto Co. have entered into an agreement for collaboration over a long period. The agreement comprises a common sale policy, and the Rio Tinto guarantees the Orkla a fixed minimum export. The Orkla has further sold to the Rio Tinto Co. methods for zinc extraction. The share capital of the Orkla Co. is 40,000,000 kroner (about £1,800,000), and its average yearly production 200,000 tons. The Rio Tinto Co. is the big Anglo-Spanish mining concern of which the present chairman is Sir A. Geddes.

DR. KOHN, who took a leading part in the discussions which led to the arrangement made between the British Mannesmann Tube Co. and the German Mannesmannroehren-Werke, A.G., by which the two companies will carry out an interchange of technical information, as announced in last week's CHEMICAL AGE, has arrived at Swansea. It is understood that he will remain for some time, and will engage himself in completing the arrangements for the restarting of the works according to the Swedish steel process, which differs from that usually employed by the Mannesmann company. There is also a possibility that the Margam works of the company will be restarted.

AT THE JUBILEE MEETING of the American Chemical Society this week, the following papers, among others, were presented before the division of industrial and engineering chemistry: "Future Trends in Electrochemistry," by W. Blum; "The Future Trend of Cellulose Chemistry," by G. J. Esselen; "Future Developments in Light Metals," by F. C. Frary; "Future Trends in Automotive Fuels," by A. C. Fieldner and R. L. Brown; "New Lines in the Recovery and Utilisation of Waste Cellulose Liquors," by U. Pomilio; "Some Economic Aspects of Texas Potash," by J. W. Turrentine; "The Cracking of Wood Tars," by J. C. Morell and J. Egloff; and "The Effect of Oxygen Concentration on Corrosion of Copper by Non-Oxidising Acids," by R. P. Russell and A. White.

APPLICATIONS ARE INVITED for the following appointments:—Head of the Department of Chemistry, Witwatersrand Technical Institute, South Africa. £450-£25-£650 plus local allowance. The Secretary, Office of the High Commissioner for the Union of South Africa, Trafalgar Square, London, W.C.2. September 30.—Adviser in Agricultural Chemistry, University of Durham (Armstrong College), Newcastle-upon-Tyne. £300 plus bonus. The Registrar. October 1.—Senior Metallurgist to the British Cast Iron Research Association. Not less than £800. The Director, 75, New Street, Birmingham. September 15.—Research Biochemist in the Walter and Eliza Hall Institute of Research, Melbourne, Australia. Two years. £750. The Agent-General for Victoria, Victoria House, Melbourne Place, Strand, London, W.C.2. September 30.—Research Chemists for the Chemical Research Laboratory, Teddington, Middlesex. Good Honours degree or equivalent and some research experience. £175-£15-£235 plus Civil Service bonus. The Secretary, Department of Scientific and Industrial Research, 16, Old Queen Street, Westminster, London, S.W.1. October 7.

THE AUSTRALIAN RADIUM CORPORATION, as the result of a ballot, has elected Doctors R. I. Bull and H. Flecker and Messrs. G. Ampt, A. Bowler, and W. Roberts as directors.

DR. DUISBERG, of the I.G., in a recent statement on the industrial position of Germany, stated that in the chemical industry business was reduced to less than 50 per cent. of the average turnover.

THE JAPANESE DYE LICENSING SYSTEM, it is believed, is likely to be rescinded. This would end the restriction of entry of German dyes, but there will probably be an agreement that competitive dyes will not be sent in.

THE UNITED KINGDOM LEAD MANUFACTURERS' ASSOCIATION has awarded its first prize for Great Britain and Ireland to George S. Francis, a student at Cardiff Technical College, in the recent minor final examination in plumbing conducted by the City and Guilds of London Institute.

SIR JAMES IRVINE, principal and vice-chancellor of the University of St. Andrews, will, during the course of his present visit to America, receive the Willard Gibbs Gold Medal of the American Chemical Society. The award is being made in recognition of the work done by Sir James Irvine on the structure and chemistry of cellulose.

THE REFRACTORY MATERIALS SECTION of the Ceramic Society held their autumn meeting in Leeds this week, extending over Thursday and Friday, and presided over by Mr. Frank West, M.I.Mech.E. On Thursday the members were entertained to luncheon at the Queen's Hotel by the Leeds Fireclay Company, Ltd.

GERMAN VISCOSE SILK MAKERS are reported to have concluded an agreement on prices and other selling terms. The firms in the combine, representing all the leading makers of viscose silk, include: Vereinigte-Glanzstoff; I. G. Dyestuffs and Dynamite group; J. Kuttner, Pirna (Saxony); the Elsterberg mills; Zehlendorf works; and Herminghaus and Co., Elberfeld.

POTASSIUM SALTS are assuming an increasing importance in Poland, where the post-war development of the salt mines owned by private concerns is also receiving much attention. The output from the State salt mines for the first quarter of the present year was 109,729 tons, as against 8,800 tons produced by mines owned by public companies and 84,649 tons from those worked by private firms.

A NEW ARTIFICIAL SILK FACTORY will be opened at Aintree, Liverpool, next month, and will give employment to 700 local men and girls. A number of the staff are now being trained in Holland, and it is anticipated that the immediate output of the factory will be 4,500 lb. of artificial silk a day. When the whole of the factory premises are completed, next summer, 2,500 people will be employed, and the output will be increased to 13,500 lb. a day.

FINES AMOUNTING to £250 and 60 guineas costs were imposed upon the British Mexican Company, as the owners of the oil tankers *Inverglass* and *Invergarry* at the Hythe (Southampton) Police Court recently for contraventions of the Oil in Navigable Waters Act. The summonses were taken out at the instance of the Southampton Harbour Board, for allowing oil to escape into Southampton Water, and evidence was given by Mr. Lewis Williams, a member of the Hampshire Board of River Conservators, and others concerning a stream of thick oil from the *Inverglass*. Evidence was also given of oil escaping from the *Invergarry*.

### Obituary

PROFESSOR P. S. TILSON, aged 59. He had been director of the Houston Laboratories, Houston, Texas.

MR. JOSEPH J. FLETCHER, B.Sc., of Sydney, aged 76. He was awarded in 1921 the Clarke Memorial Medal for Scientific Research by the Royal Society of New South Wales and for 33 years was secretary of the Linnean Society.

MR. FREDERICK GEORGE LOMAX, aged 69, of Goring Heath. Mr. Lomax was chairman of the Chilean Nitrate Commission, and of the Santa Catalina Nitrate Co., and a director of the Alianza Company and the Angela Nitrate Co.

DR. C. W. ELIOT, on August 22, aged 92. From 1865 to 1869 he was professor of chemistry in the Massachusetts Institute of Technology, and from 1869 to 1909 president of Harvard University. Among other books he wrote "A Compendious Manual of Quantitative Chemical Analysis."

MR. WALTER OAKES, aged 74, in Salford Hospital. Mr. Oakes on his recent retirement ranked as the oldest employe of Brunner, Mond and Co., of Northwich. He had been with the firm 52 years and received all the long service awards and was honoured at the firm's jubilee celebrations as one of the company's surviving pioneers.

MR. LOUIS ROCHLING, of Saarbrücken, aged 63. After leaving the Saarbrücken High School he underwent a period of training in the family business at Ludwigshafen, and then took over with his brother Hermann the management of Völklinger Iron Works, which had been acquired by the firm. He took a leading part in the affairs of the German iron and steel industry, and was president of the German Steel Works Association for many years until the Saar territory was separated from Germany in 1919.

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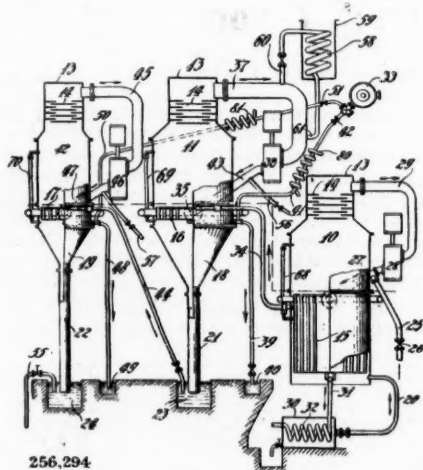
### Abstracts of Complete Specifications

256,281. DYESTUFFS AND DYESTUFF INTERMEDIATES. R. F. Thomson, John Thomas, and Scottish Dyes, Ltd., Murrell Hill Works, Carlisle. Application date, February 2, 1925.

Specification No. 193,431 (see THE CHEMICAL AGE, Vol. VIII, page 348) describes the preparation of dyestuffs by alkylating, amongst other compounds, oxidised isodibenzanthrones. Another method is now described for producing some of these products. A Bz1-halogenbenzanthrone is nitrated and the nitro compound reduced to the corresponding amido-halogen compound; the amido group is then exchanged for hydroxyl by the diazo reaction, the hydroxy-halogenbenzanthrone alkylated, and the resulting alkoxy-Bz1-halogenbenzanthrone treated with alkaline condensing agents to form the dyestuff. Examples of the various steps are given. Technical monochlorbenzanthrone is nitrated in nitrobenzene solution with nitric acid, and the nitro compound reduced with zinc dust and hydrochloric acid in pyridine or aniline, or with aluminium powder in concentrated sulphuric acid; the amido-chlor compound yields a stable sulphate and an acetyl derivative and is also capable of dyeing cellulose acetate. The amido chlor compound is diazotised, boiled, and the resulting hydroxy compound methylated with dimethylsulphate; the product upon being heated with alcoholic potash, yields a methoxyisodibenzanthrone which dyes cotton from the vat in reddish blue shades and may also be used for printing.

256,294. EXTRACTION OF SALTS FROM AQUEOUS SOLUTIONS AND APPARATUS THEREFOR. A. J. Stephens, 285, High Holborn, London. From The Salt Production Syndicate, Ltd., Sydney, New South Wales, Australia. Application date, April 1, 1925.

When sodium chloride is obtained by evaporation of sea water it is found that certain salts, particularly calcium sulphate, are precipitated as a scale upon the heating surfaces.



256,294

In this process the formation of the scale is avoided by carrying out the evaporation stage at which the calcium sulphate is precipitated below a critical temperature of about 38° C., at which temperature the solubility of calcium sulphate in the brine is a maximum. Above that temperature, therefore, as evaporation progresses, calcium sulphate is precipitated in the parts of the liquid at the highest temperature, that is, on the heaters, but below this temperature the reverse is the case and the calcium sulphate precipitates away from the heaters and falls to the bottom as an easily removable sludge. Accordingly the evaporation is performed in three stages, in the first at a high temperature until the bulk has been reduced to one-third, in the second at 38° C. (under diminished pressure) for precipitation of calcium sulphate, and in the final stage at high or low temperature for separation of sodium

chloride. The heaters (calandrias) used in the low pressure stages are preferably very shallow and near the surface since at such pressures a small difference in hydrostatic pressure in the liquid causes the boiling point to vary considerably. Fig. 1 shows a form of apparatus. The sea water enters by the pipe 20, the first evaporator 10 heated by the calandria 15 which is supplied with steam from the evaporator which has been subjected in known manner to recompression in the compressor 28 in order to raise its temperature; steam can be supplied by the pipe 25 to bring the contents of the evaporator 10 to the boiling point; the hot condensate from the calandria 15 is used in the brine pre-heater 30. The concentrated brine passes by the pipe 34 to the second evaporator 11 where it is evaporated at 38° C. by the calandria 16 which also is heated by recompressed vapour; the lower part of 11 terminates in a pipe 21 dipping into a sump 23 at hydrostatic level in which the calcium sulphate accumulates. The brine then passes by the pipe 44 to a third evaporator 12, similar to evaporator 11, in which sodium chloride is separated. An air pump 33 connected by pipes 41 and 50 serves to maintain the necessary vacuum in the second and third stages. The process is also applicable to the extraction of salts other than sodium chloride from their aqueous solutions.

256,302. PIGMENTS AND PAINTS, PREPARATION OF. C. Weizmann and J. Blumenfeld, 16, Addison Crescent, London, W.14. Application date, April 22, 1925.

Pigments of the type which have little or no action on linseed oil, or paints containing such pigments, have added to them small quantities of a true metallic peroxide or persalt; the per compounds must be such as give rise to hydrogen peroxide when treated with acids. The pigment is thereby caused to have a sufficient oxidising action on linseed oil without recourse to addition of large amounts of other substances such as zinc oxide, an excess of which, in the case of titanium oxide pigments, causes a serious diminution in opacity. Peroxides and persalts of alkali and alkaline earth metals are suitable. Examples are given of pigments containing titanium oxide, together with zinc, aluminium, or magnesium hydroxide, and about 10 per cent. of barium peroxide.

256,385. DRYING AND NEUTRALISING SULPHATE OF AMMONIA AND THE LIKE, IMPROVED APPARATUS FOR. T. B. Smith, 153, Oxford Road, Linthorpe, Middlesbrough. Application date, July 13, 1925.

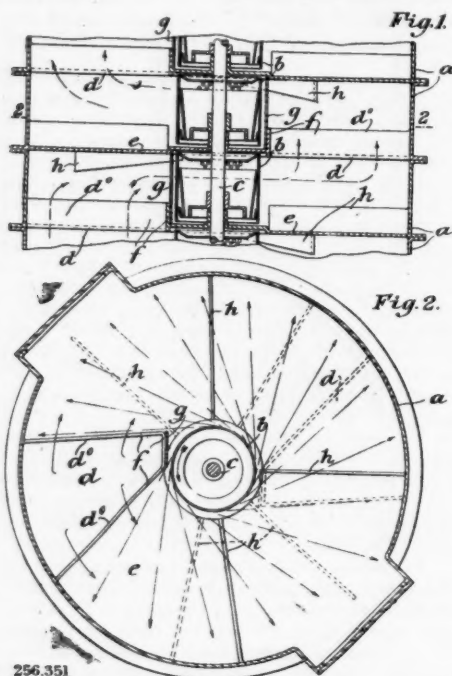
An apparatus for neutralising and drying ammonia sulphate or other salts consists of a shallow heated iron pan into which a charge of the salt and the neutralising agent is introduced. A vertical rotating shaft carries a horizontal bar on opposite ends of which are disposed two series of blades which are so inclined to the direction of motion that while one set tends to carry the material towards the centre of the pan the other carries it in the reverse direction. Either set may be lifted out of action by rotating it about the supporting bar. When the charge is dry it is carried towards the periphery of the pan by raising the appropriate set of blades and discharged through a suitable opening.

256,351. EFFECTING INTIMATE CONTACT BETWEEN LIQUIDS AND GASES, IMPROVEMENTS IN APPARATUS FOR. Kirkham, Hulett, and Chandler, Ltd., 37 and 38, Norfolk House, Norfolk Street, Strand, London, W.C.2, and W. F. Slater, Church House, Mansfield, Notts. Application date, May 25, 1925.

An apparatus for the treatment of a gas with a liquid, for example as in the extraction of ammonia, etc., from coal gas, consists of a series of superposed chambers in each of which is a rotary sprayer of approximately the full height of the chamber, the sprayers being mounted on and driven by a common vertical shaft. Openings in the base of the chambers permit the gas to be treated to ascend through the series while the liquid descends; the successive openings may be in staggered relation to one another or suitable baffles may be arranged to deflect the gas round each chamber; in any case



the openings are furnished with a lip to retain sufficient liquid to supply the sprayer. Fig. 1 is a sectional elevation of a portion of one form of apparatus and Fig. 2 a horizontal section through the line 2-2. The superposed chambers *a*, *a*,



are provided with rotary spraying devices *b* consisting of perforated baskets and mounted on the shaft *c*. The openings *d* are provided with liquid retaining lips *f*, *j* and baffles *g* to prevent liquid being thrown directly through the openings *d*. Other baffles *h* may be provided to increase the length of the path of the gas.

256,394. ARTIFICIAL RESINS, PROCESS FOR THE MANUFACTURE OF. A. Regal, 11, Fischergasse, Brno, Czechoslovakia. Application date, July 29, 1925.

The condensation of phenols with formaldehyde so as to obtain resinous products is effected in the presence of a compound made by the action of formaldehyde on an aromatic amine in which the hydrogen atoms of the amino group are substituted by organic radicles. The resinous products, after hardening, are stated to possess unusual elasticity combined with great hardness. According to an example 400 grams formaldehyde, 2 grams of dimethylaniline, 100 to 150 grams of hexamethylene tetramine, and the same quantity of para-formaldehyde are boiled together for some time, 1,000 grams of phenol added, and the whole boiled under a reflux condenser until the resin (a resol) has been formed. The dimethylaniline becomes converted into tetramethyl-*p*-diaminodiphenylmethane which acts as the condensing agent in the subsequent reaction. Diethylaniline may be used instead of dimethylaniline.

256,428. REMOVAL OF IRON FROM MATERIALS CONTAINING THE SAME. J. Y. Johnson, London. From the Badische Anilin und Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, October 3, 1925.

It is known that iron carbonyl can be prepared by treating ferric oxide or material containing it with carbon monoxide under elevated pressure. It is now found that iron may be removed from materials containing it by treating the materials with a rapid current of carbon monoxide or gases containing carbon monoxide; the iron carbonyl is thus removed as formed and practically all the iron is removed from the material. If desired the oxide of iron in the materials may be reduced to metallic iron by a previous treatment with another reducing gas. The iron carbonyl is subsequently decomposed, preferably by heating to about 200° C. under ordinary pressure, very pure iron resulting together with carbon monoxide which is used again. The following applications of the process are

given:—(1) bauxite containing iron oxide is heated to 250° C. and water gas passed over it at a pressure of 100 atmospheres; the iron is almost completely removed; (2) titaniferous iron sand containing 25.2 per cent. of iron is reduced with hydrogen at 900° C. and treated with carbon monoxide at 200° C. and 200 atmospheres pressure; the production of pure titanic acid from the residue, which contains but 0.6 per cent. of iron, is much facilitated; (3) a roasted iron pyrites containing 3.08 per cent. of copper is similarly treated, the residue containing 38.4 per cent. of copper.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention:—242,223 (H. Wolf), relating to the conversion of high boiling into low boiling hydrocarbons, see Vol. XIV, p. 15; 245,128 (W. Carpmael, from I.G. Farbenindustrie Akt.-Ges.), relating to manufacture of azodyestuffs, see Vol. XIV, p. 233; 251,666 (H. Staudinger), relating to the manufacture of an ester of *N*-allyl-2:6-dimethyl-4-oxypiperidine, see Vol. XV, p. 87.

#### International Specifications not yet Accepted

254,340. DYES. I.G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. (Assignees of Farbwerke vorm. Meister, Lucius, und Brüning, Höchst-on-Main, Germany.) International Convention date, June 27, 1925.

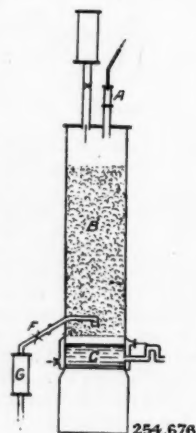
It is found that 5:5':6:6'-tetrahalogen-4:4'-dimethylthioindigos are obtained when 6:6'-dihalogen-4:4'-dimethylthioindigos are halogenated by the known methods, the additional halogen entering the 5:5'-positions, and not the 7:7'-positions as might be expected. The resulting dyes dye cotton from the vat in reddish-violet shades, particularly fast to boiling. The halogenation may be effected in the presence of a solvent such as chloresulphonic acid, phosphorus oxychloride, or a halogenated hydrocarbon such as chlorobenzene; a catalyst such as iodine or antimony pentachloride may be used. The bromination of 6:6'-dichlor-4:4'-dimethylthioindigo in chloresulphonic acid or nitrobenzene and the chlorination of the same compound in chloresulphonic acid in presence of iodine are described.

254,674. RESINS; BITUMENS. F. Wilhelm, Ploesti, Roumania. International Convention date, June 30, 1925.

Neutral bitumens are produced from the acid resins obtained in the refining of mineral oils by reducing the sulphuric acid contained therein to sulphur and water by means of sulphuretted hydrogen at a temperature of about 130° C.; alternatively sulphur may be added to produce sulphuretted hydrogen by interaction with part of the hydrocarbons. The sulphur produced in the reduction of the sulphuric acid also reacts with hydrocarbons to produce more sulphuretted hydrogen; there thus results a cyclic process which only ceases when all the acid has been removed. The acid resins may be heated prior to the treatment with sulphuretted hydrogen, etc., any acid which separates being removed. The hardness of the final product can be varied by varying the amount of acid left in the resins before the treatment. The products are suitable for street-paving, and for producing liquid asphalt, waterproof bitumen, etc.

254,676. PURIFYING CARBON BISULPHIDE. E. Legeler and P. Esselmann, Westhavelland, Premnitz, Germany. International Convention date, July 6, 1925.

This is an application for a patent of addition to No. 238,489 (see THE CHEMICAL AGE, Vol. XIV, p. 305). Crude carbon bisulphide is purified by passing the liquid from an inlet A, down a column B in which it meets the vapours of carbon bisulphide produced in the heater C. Pure carbon bisulphide vapours are withdrawn by the pipe F near the base of the column and condensed in the condenser G. Instead of withdrawing the vapours at F, the column B may be surrounded by a column in which the vapours rise and are rectified.



- 254,679. CARBON ARTICLES. I. G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. (Assignees of Akt.-Ges. für Anilin Fabrikation, Treptow, Berlin.) International Convention date, June 30, 1925.

The process of the invention consists in building up carbon articles such as plates, rods, or tubes, for use in the chemical industry, by applying layer after layer of molten carbon. This is effected by moving relatively to each other carbon electrodes through which are passed an electric current sufficient to melt the carbon. Thus the electrode undergoing fusion may be moved over a carbon plate so that layer after layer of molten carbon is formed. The process may be conducted under pressure.

#### LATEST NOTIFICATIONS.

- 257,618. Manufacture of vat-dyestuffs. I. G. Farbenindustrie Akt.-Ges. August 26, 1925.  
257,619. Process for introducing sulphocyanide groups into organic compounds. I. G. Farbenindustrie Akt.-Ges. August 27, 1925.  
257,622. Manufacture of acetals. Consortium für Electro-Chemische Industrie Ges. August 27, 1925.

#### Specifications Accepted with Date of Application

- 246,833. Phenol-aldehyde condensation products in a purified form. Bakelite Ges. January 27, 1925.  
247,524. Alkali hydrosulphites, Process for the manufacture of. Farbenfabriken vorm. F. Bayer and Co. February 14, 1925.  
250,199. Dehydrating formic acid, Process for. Chemische Fabrik auf Actien (vorm. E. Schering). April 6, 1925.  
250,208. Purifying silicates of baryta, Process for. C. Deguide. April 3, 1925.  
253,114. Method of imparting to desiccants a large superficial area. Deutsche Gasglühlicht Auer-Ges. June 8, 1925.  
257,023. Removal of arsenic from tin. H. Harris. May 20, 1925.  
257,084. Enriching ore containing limestone, Method of. I. Bashiloff. July 31, 1925.  
257,133. The complete elimination of zinc from zinciferous ores and the like, especially zinciferous purple ores or calcined residues. A. L. Mond. (Metallbank und Metallurgische Ges., Akt.-Ges.) November 17, 1925.  
257,148. Colour lakes containing molybdenum, Manufacture and production of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) December 17, 1925.  
257,151. Decresotising tars and tar products. K. Bube. December 22, 1925.  
257,152. Obtaining light hydrocarbons and carbon from heavy hydrocarbons, coal tar, pitch and the like, Process and apparatus for. W. Knapp and Wandsbeker Maschinenfabrik und Eisenanstalt B. Fischer und C. Steiding. December 24, 1925.  
257,170. Separating fatty acids from glycerides, Process for. A. Eisenstein. February 16, 1926.  
257,208 and 257,209. Rotary gas washer, absorption apparatus, and the like. M. Aurig and G. Brucklmayr. May 17, 1926.

#### Applications for Patents

- British Dyestuffs Corporation, Ltd., and Cronshaw, C. J. T. Manufacture of brushes, etc. 21,547. September 1.  
British Dyestuffs Corporation, Ltd., and Cronshaw, C. J. T. Manufacture of vat dyes. 21,660. September 2.  
British Dyestuffs Corporation, Ltd., and Cronshaw, C. J. T. Manufacture of vulcanised rubber, etc. 21,767. September 3.  
Carpmael, W., and I. G. Farbenindustrie Akt.-Ges. Removal of liquid polymers from synthetic rubber. 21,798. September 3.  
Coley, H. E. Manufacture of zinc oxide. 21,578. September 1.  
Hengstmann, H. Converting rock phosphate into soluble phosphoric acid. 21,552. September 1.  
Kissock, A. Process of producing molybdates. 21,859. September 4.  
Negle, A. Apparatus for production of nitric oxide from ozonised air. 21,346. August 30.  
Norris, G. C., Rhodesia Broken Hill Development Co., Ltd., Stevens, R. H., and Watson, W. N. Purification of zinc solutions. 21,561. September 1.  
Pease, E. L. Extraction of ammonia from coal-gas, etc. 21,543. September 1.  
Standard Development Co. Process of treating sulphur-containing oils. 21,749. September 3. (United States, May 8.)  
Synthetic Ammonia and Nitrates, Ltd. Treatment of bituminous coals, etc. 21,288. August 30.  
Thornley, S. Manufacture of vat dyes. 21,660. September 2.

Wickop, L., and Zahn and Co. Bau Chemische Fabriken Ges. Process for separating chromium, etc. 21,349. August 30.  
Yorkshire Dyeware and Chemical Co., Ltd. Manufacture of cement for linoleum, etc. 21,354. August 30.

#### Carbon Black Production in U.S.A.

THE production of carbon black in the United States in 1925 amounted to 177,417,378 lb., according to reports made to the Bureau of Mines, from 63 plants operating in eight States. This production is a decrease of 9,454,656 lb., or 5 per cent., from the total output reported in 1924, and marks the first decline in yearly production of carbon black since 1920. On the other hand, deliveries to consumers in 1925 were higher than ever before, the total for the year, 175,631,326 lb., being an increase over 1924 of 36 per cent. This large increase in indicated consumption, despite the decline in production, resulted from a radical change in the situation as regards stocks, which were largely increased in 1924, but which remained steady in 1925. Although the carbon black industry bettered its position as regards stocks of carbon black in 1925, there was no favourable reaction as to price, which reached a new low level of 5.4 cents as the average per lb. at the plant. This compares with 6.2 cents in 1924.

It is estimated that 140,000,000,000 cubic ft. of natural gas was burned for carbon black in 1925, and the average recovery per thousand cubic feet was, therefore, 1.3 lb., an increase over 1924. While there is a growing tendency in most producing areas to restrict the supply of natural gas for carbon black, production has not fallen off materially, owing to improvements in equipment or in operating methods. Exports of carbon black in 1925 amounted to 43,182,635 lb., which is equivalent to nearly 25 per cent. of the total production.

#### Arsenic Production in Canada

FINALLY revised statistics on the production of arsenic from Canadian ores, as reported by the Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics, show an output of 3,434,137 lb. in 1925 as compared with 4,621,567 in 1924. Arsenic in large quantities is consumed in the manufacture of calcium arsenate, an insecticide which is most effective in combating the boll weevil. In some years this insect is a serious menace to the southern cotton crop, but during 1925 the infestation was very light, and arsenic producers were in a position to supply far more than the demand, with the result that prices of arsenic fell from 6.16 cents per lb. in January to 3.44 cents in December. In Canada arsenic is used in the manufacture of paris green, lead arsenate, lime arsenate, sheep dips and other insecticides. Other uses are in the manufacture of glass and to a small extent in medicinal and pharmaceutical preparations. Arsenic is recovered from the concentrates of the arsenical pyritic ore of the Nickel Plate Mine, Hedley, B.C., which are exported from Canada to be treated in foreign smelters. White arsenic is produced in Canada by the South Ontario smelters in the treatment of ores and residues from the Cobalt camp. In 1925 the British Columbia source provided 1,277,696 lb., valued at \$16,978, and the Ontario source 2,156,441 lb., valued at \$113,324.

#### Graphite Production in U.S.A.

THE graphite industry in the United States on the whole continued to decline in output in 1925. The output in 1925 was 4,665 short tons, valued at \$96,361. This was a decrease of 306 short tons, or 6 per cent., but an increase of \$8,851, or 10 per cent., compared with 1924. The decrease in output was in the amorphous variety, crystalline graphite increasing in both quantity and value. The 1925 output of amorphous graphite amounted to 3,536 short tons (76 per cent. of the total graphite), a decrease of 535 tons, or 13 per cent. compared with 1924. The value of amorphous graphite produced in 1925 was \$39,640, an increase of 3 per cent. compared with 1924. The production of crystalline graphite in 1925 was 2,257,250 lb., valued at \$56,721, an increase of 456,925 lb., or 25 per cent., and \$7,744, or 16 per cent., compared with 1924. The imports of graphite in 1925 amounted to 17,768 short tons, valued at \$826,410, compared with 16,375 tons, valued at \$339,511, in 1924. This was an increase of nearly 9 per cent. in quantity and 107 per cent. in value compared with 1924.

## Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

### General Heavy Chemicals

**ACID ACETIC**, 40% TECH.—£19 per ton.  
**ACID BORIC**, COMMERCIAL.—Crystal, £37 per ton, Powder, £39 per ton.  
**ACID HYDROCHLORIC**.—3s. 9d. to 6s. per carboy d/d, according to purity, strength, and locality.  
**ACID NITRIC**, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.  
**ACID SULPHURIC**.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.  
**AMMONIA ALKALI**.—£6 15s. per ton f.o.r. Special terms for contracts.  
**BISULPHITE OF LIME**.—£7 10s. per ton, packages extra, returnable.  
**BLEACHING POWDER**.—Spot, £9 10s. d/d; Contract, £8 10s. d/d, 4-ton lots.  
**BORAX**, COMMERCIAL.—Crystal, £23 per ton. Powder, £24 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)  
**CALCIUM CHLORATE (SOLID)**.—£5 12s. 6d. to £5 17s. 6d. per ton d/d cart. paid.  
**COPPER SULPHATE**.—£25 to £25 10s. per ton.  
**METHYLATED SPIRIT 64 O.P.**—Industrial, 2s. 5d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.  
**NICKEL SULPHATE**.—£38 per ton d/d.  
**NICKEL AMMONIA SULPHATE**.—£38 per ton d/d.  
**POTASH CAUSTIC**.—£30 to £33 per ton.  
**POTASSIUM BICHROMATE**.—4½d. per lb.  
**POTASSIUM CHLORATE**.—3½d. per lb., ex wharf, London, in cwt. kegs.  
**SALAMMONIAC**.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, cart. paid.  
**SALT CAKE**.—£3 15s. to £4 per ton d/d. In bulk.  
**SODA CAUSTIC**, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.  
**SODA CRYSTALS**.—£5 to £5 5s. per ton ex railway depots or ports.  
**SODIUM ACETATE 97/98%**.—£21 per ton.  
**SODIUM BICARBONATE**.—£10 10s. per ton, cart. paid.  
**SODIUM BICROMATE**.—3½d. per lb.  
**SODIUM BISULPHITE POWDER 60/62%**.—£17 per ton for home market, 1-cwt. iron drums included.  
**SODIUM CHLORATE**.—3d. per lb.  
**SODIUM NITRITE**, 100% BASIS.—£27 per ton d/d.  
**SODIUM PHOSPHATE**.—£14 per ton, f.o.r. London, casks free.  
**SODIUM SULPHATE (GLAUBER SALTS)**.—£3 12s. 6d. per ton.  
**SODIUM SULPHIDE CONC. SOLID**, 60/65.—£13 5s. per ton d/d. Contract, £13. Cart. paid.  
**SODIUM SULPHIDE CRYSTALS**.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Cart. paid.  
**SODIUM SULPHITE, PEA CRYSTALS**.—£14 per ton f.o.r. London. 1-cwt. kegs included.

### Coal Tar Products

**ACID CARBOLIC CRYSTALS**.—4½d. to 5d. per lb. Crude 60's, 1s. 4d. to 1s. 5d.  
**ACID CRESYLIC** 99/100.—2s. 6d. per gall. 97/99.—2s. to 2s. 2d. per gall. Pale, 95%, 1s. 10d. to 2s. per gall. Dark, 1s. 9d. to 1s. 10d. per gall. Steady.  
**ANTHRACENE**.—A quality, 2½d. to 3d. per unit.  
**ANTHRACENE OIL**, STRAINED.—8d. to 8½d. per gall. Unstrained, 7½d. to 8d. per gall.  
**BENZOL**.—Crude 65's, 1s. 4d. to 1s. 5d. per gall., ex works in tank wagons. Standard Motor, 2s. to 2s. 3d. per gall., ex works in tank wagons. Pure, 3s. to 3s. 3d. per gall., ex works in tank wagons.  
**TOLUOL**.—90%, 3s. to 3s. 3d. per gall. Pure, 3s. 6d. to 3s. 9d. per gall.  
**XYLOL**.—2s. 4d. to 3s. 6d. per gall. Pure, 4s. per gall.  
**CREOSOTE**.—Cresylic, 20/24%, 10d. per gall. Standard specification, middle oil, 6½d. to 7½d. per gall. Heavy, 7½d. to 7½d. per gall.  
**NAPHTHA**.—Crude, 10d. to 1s. 1d. per gall. according to quality. Solvent 90/160, 2s. to 2s. 3d. per gall. Solvent 90/190, 1s. 5d. to 1s. 6d. per gall.  
**NAPHTHALENE CRUDE**.—Drained Creosote Salts, £3 10s. to £5 per ton. Whizzed or hot pressed, £5 10s. to £7 10s.  
**NAPHTHALENE**.—Crystals and Flaked, £11 10s. to £13 per ton, according to districts.  
**PITCH**.—Medium soft, 92s. 6d. to 100s. per ton.  
**PYRIDINE**.—90/140, 17s. to 20s. per gall. Heavy, 7s. to 10s. per gall.

### Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

**ACID AMIDONAPHTHOL DISULPHO (1-8-2-4)**.—10s. 9d. per lb.  
**ACID ANTHRANILIC**.—6s. 6d. per lb. 100%.  
**ACID BENZOIC**.—1s. 9d. per lb.  
**ACID GAMMA**.—8s. per lb.  
**ACID H**.—3s. 3d. per lb. 100% basis d/d.  
**ACID NAPHTHIONIC**.—2s. 2d. per lb. 100% basis d/d.  
**ACID NEVILLE AND WINTHER**.—4s. 9d. per lb. 100% basis d/d.  
**ACID SULPHANILIC**.—9d. per lb. 100% basis d/d.  
**ANILINE OIL**.—9½d. per lb. naked at works.  
**ANILINE SALTS**.—9½d. to 7½d. per lb. naked at works.  
**BENZALDEHYDE**.—2s. 1d. per lb.  
**BENZIDINE BASE**.—3s. 3d. per lb. 100% basis d/d.  
**o-CRESOL 29/31° C**.—3d. to 3½d. per lb.  
**m-CRESOL 98/100%**.—2s. 1d. to 2s. 3d. per lb.  
**p-CRESOL 32/34° C**.—2s. 1d. to 2s. 3d. per lb.  
**DICHLORANILINE**.—2s. 3d. per lb.  
**DIMETHYLANILINE**.—1s. 11d. to 2s. per lb. d/d. Drums extra.  
**DINITROBENZENE**.—9d. per lb. naked at works.  
**DINITROCHLOROBENZENE**.—£84 per ton d/d.  
**DINITROTOLUENE**.—48/50° C. 8d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.  
**DIPHENYLANILINE**.—2s. 10d. per lb. d/d.  
**a-NAPHTHOL**.—2s. per lb. d/d.  
**B-NAPHTHOL**.—11d. to 1s. per lb. d/d.  
**a-NAPHTHYLAMINE**.—1s. 3d. per lb. d/d.  
**B-NAPHTHYLAMINE**.—3s. 2d. per lb. d/d.  
**o-NITRANILINE**.—5s. 9d. per lb.  
**m-NITRANILINE**.—3s. 3d. per lb. d/d.  
**p-NITRANILINE**.—1s. 9d. per lb. d/d.  
**NITROBENZENE**.—7d. per lb. naked at works.  
**NITRONAPHTHALENE**.—10d. per lb. d/d.  
**R. SALT**.—2s. 4d. per lb. 100% basis d/d.  
**SODIUM NAPHTHIONATE**.—1s. 9d. per lb. 100% basis d/d.  
**o-TOLUIDINE**.—9d. per lb. naked at works.  
**p-TOLUIDINE**.—2s. 2d. per lb. naked at works.  
**m-XYLIDINE ACETATE**.—2s. 11d. per lb. 100%.

### Wood Distillation Products

**ACETATE OF LIME**.—Brown, £8. Grey, £17 10s. per ton. Liquor, 9d. per gall. 32° Tw.  
**CHARCOAL**.—£7 to £9 per ton, according to grade and locality.  
**IRON LIQUOR**.—1s. 6d. per gall. 32° Tw. 1s. 2d. per gall., 24° Tw.  
**RED LIQUOR**.—9½d. to 1s. per gall.  
**WOOD CREOSOTE**.—2s. 9d. per gall. Unrefined.  
**WOOD NAPHTHA**, MISCIBLE.—3s. 6d. per gall. 60% O.P. Solvent, 3s. 6d. per gall. 40% O.P.  
**WOOD TAR**.—£3 to £5 per ton, according to grade.  
**BROWN SUGAR OF LEAD**.—£39 to £40 per ton.

### Rubber Chemicals

**ANTIMONY SULPHIDE**.—Golden, 6d. to 1s. 5d. per lb., according to quality, Crimson, 1s. 3d. to 1s. 7½d. per lb., according to quality.  
**ARSENIC SULPHIDE**, YELLOW.—2s. per lb.  
**BARYTES**.—£3 10s. to £6 15s. per ton, according to quality.  
**CADMIUM SULPHIDE**.—2s. 9d. per lb.  
**CARBON BISULPHIDE**.—£20 to £25 per ton, according to quantity.  
**CARBON BLACK**.—5½d. per lb., ex wharf.  
**CARBON TETRACHLORIDE**.—£46 to £55 per ton, according to quantity, drums extra.  
**CHROMIUM OXIDE**, GREEN.—1s. 2d. per lb.  
**DIPHENYLGUANIDINE**.—3s. 9d. per lb.  
**INDIARUBBER SUBSTITUTES**, WHITE AND DARK.—5½d. to 6½d. per lb.  
**LAMP BLACK**.—£35 per ton, barrels free.  
**LEAD HYPOSULPHITE**.—9d. per lb.  
**LITHOPONE**, 30%.—£22 10s. per ton.  
**MINERAL RUBBER "RUBPRON"**.—£13 12s. 6d. per ton f.o.r. London.  
**SULPHUR**.—£9 to £11 per ton, according to quality.  
**SULPHUR CHLORIDE**.—4d. per lb., carboys extra.  
**SULPHUR PRECIP. B.P.**.—£47 10s. to £50 per ton.  
**THIOCARBAMIDE**.—2s. 6d. to 2s. 9d. per lb. carriage paid.  
**THIOCARBANILIDE**.—2s. 1d. to 2s. 3d. per lb.  
**VERMILION**, PALE OR DEEP.—5s. 3d. per lb.  
**ZINC SULPHIDE**.—1s. 1d. per lb.



## Pharmaceutical and Photographic Chemicals

ACID, ACETIC, 80% B.P.—£39 per ton ex wharf London in glass containers.

ACID, ACETYL SALICYLIC.—2s. 4d. to 2s. 6d. per lb. Brisk demand.

ACID, BENZOIC B.P.—2s. to 2s. 3d. per lb., according to quantity.

ACID, BORIC B.P.—Crystal, £43 per ton; Powder, £47 per ton. Carriage paid any station in Great Britain, in ton lots.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—1s. 3½d. to 1s. 5d. per lb., less 5%.

ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.

ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.

ACID, SALICYLIC.—1s. 3½d. to 1s. 5½d. per lb. Technical.—10½d. to 11d. per lb.

ACID, TANNIC B.P.—2s. 9d. to 2s. 11d. per lb.

ACID, TARTARIC.—1s. 0½d. per lb., less 5%. Market firm.

AMIDOL.—9s. per lb., d/d.

ACETANILIDE.—1s. 7d. to 1s. 8d. per lb. for quantities.

AMIDOPYRIN.—11s. 6d. per lb.

AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity.

AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks.

ATROPINE SULPHATE.—11s. per oz. for English make.

BARBITONE.—9s. per lb.

BENZONAPHTHOL.—3s. 3d. per lb. spot.

BISMUTH CARBONATE.—12s. 6d. to 14s. 3d. per lb.

BISMUTH CITRATE.—9s. 6d. to 11s. 3d. per lb.

BISMUTH SALICYLATE.—10s. 3d. to 12s. per lb.

BISMUTH SUBNITRATE.—10s. 9d. to 12s. 6d. per lb. according to quantity.

BORAX B.P.—Crystal, £27; Powder, £28 per ton. Carriage paid any station in Great Britain, in ton lots.

BROMIDES.—Potassium, 1s. 8d. to 1s. 11d. per lb.; sodium, 1s. 10d. to 2s. 2d. per lb.; ammonium, 2s. 1d. to 2s. 5d. per lb., all spot.

CALCIUM LACTATE.—1s. 3d. to 1s. 5d.

CHLORAL HYDRATE.—3s. 3d. to 3s. 6d. per lb., duty paid.

CHLOROFORM.—2s. 3d. to 2s. 7½d. per lb., according to quantity.

CRESOTE CARBONATE.—6s. per lb.

FORMALDEHYDE.—£39 per ton, in barrels ex wharf.

GUAIACOL CARBONATE.—7s. to 7s. 6d. per lb.

HEXAMINE.—2s. 4d. to 2s. 6d. per lb.

HOMATROPINE HYDROBROMIDE.—30s. per oz.

HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.

HYDROGEN PEROXIDE (12 vols.).—1s. 8d. per gallon f.o.r. makers' works, naked.

HYDROQUINONE.—4s. 3d. per lb., in cwt. lots.

HYPOPHOSPHITES.—Calcium, 3s. 6d. per lb., for 28-lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.

IRON AMMONIUM CITRATE B.P.—2s. to 2s. 3d. per lb. Green, 2s. 4d. to 2s. 9d. per lb. U.S.P., 2s. 1d. to 2s. 4d. per lb.

IRON PERCHLORIDE.—20s. to 22s. per cwt., according to quantity.

MAGNESIUM CARBONATE.—Light Commercial, £31 per ton net.

MAGNESIUM OXIDE.—Light Commercial, £67 10s. per ton, less 2½%; price reduced; Heavy Commercial, £22 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.

MENTHOL.—A.B.R. recrystallised B.P., 19s. 9d. net per lb., Synthetic, 11s. to 12s. 6d. per lb., according to quality.

MERCURIALS.—Red oxide, 5s. 11d. to 6s. 1d. per lb.; Corrosive sublimate, 4s. 3d. to 4s. 5d. per lb.; white precipitate, 4s. 9d. to 4s. 11d. per lb.; Calomel, 4s. 6d. to 4s. 8d. per lb.

METHYL SALICYLATE.—1s. 4d. to 1s. 7d. per lb.

METHYL SULFONAL.—16s. 6d. per lb.

METOL.—11s. per lb. British make.

PARAFORMALDEHYDE.—1s. 9d. for 100% powder.

PARALDEHYDE.—1s. 2d. to 1s. 4d. per lb.

PHENACETIN.—3s. 9d. to 4s. per lb.

PHENAZONE.—5s. 9d. to 6s. per lb.

PHENOLPHTHALEIN.—4s. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—81s. per cwt., less 2½% for ton lots.

POTASSIUM CITRATE.—1s. 11d. to 2s. 2d. per lb.

POTASSIUM FERRICYANIDE.—1s. 9d. per lb. in cwt. lots. Quiet.

POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.

POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included, f.o.r. London.

POTASSIUM PERMANGANATE.—B.P. crystals, 6½d. per lb., spot.

QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., in 100 oz. tins.

RESORCIN.—4s. 3d. to 4s. 9d. per lb., spot.

SACCHARIN.—55s. per lb.

SALOL.—3s. per lb.

SODIUM BENZOATE, B.P.—1s. 10d. to 2s. 2d. per lb.

SODIUM CITRATE, B.P.C., 1911.—1s. 8d. to 1s. 11d. per lb., B.P.C., 1923. 1s. 11d. to 2s. 2d. per lb., according to quantity.

SODIUM FERROCYANIDE.—4d. per lb. carriage paid.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 5s. per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—75s. to 85s. per cwt., according to quantity.

SODIUM SALICYLATE.—Powder, 1s. 9d. to 1s. 10d. per lb. Crystal, 1s. 10d. to 1s. 11d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.

SODIUM SULPHITE, ANHYDROUS, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.

SULPHONAL.—10s. 6d. per lb.

TARTAR EMETIC, B.P.—Crystal or Powder, 1s. 11d. to 2s. per lb.

THYMOL.—11s. to 13s. per lb.

## Perfumery Chemicals

ACETOPHENONE.—10s. per lb.

AUBEPINE (EX ANETHOL).—10s. 9d. per lb.

AMYL ACETATE.—2s. per lb.

AMYL BUTYRATE.—5s. 6d. per lb.

AMYL SALICYLATE.—3s. 3d. per lb.

ANETHOL (M.P. 21/22° C.).—6s. per lb.

BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. 1d. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—2s. 1d. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—2s. 7d. per lb.

BENZYL BENZOATE.—2s. 4d. per lb.

CINNAMIC ALDEHYDE NATURAL.—17s. 9d. per lb.

COUMARIN.—11s. 6d. per lb.

CITRONELLOL.—15s. per lb.

CITRAL.—9s. 6d. per lb.

ETHYL CINNAMATE.—10s. per lb.

ETHYL PHTHALATE.—3s. per lb.

EUGENOL.—10s. per lb.

GERANIOL (PALMAROSA).—19s. per lb.

GERANIOL.—6s. 3d. to 10s. 6d. per lb.

HELIOTROPINE.—5s. per lb.

ISO EUGENOL.—14s. 6d. per lb.

LINALOL.—12s. to 17s. per lb.

LINALYL ACETATE.—15s. to 18s. 6d. per lb.

METHYL ANTHRANILATE.—9s. 3d. per lb.

METHYL BENZOATE.—5s. per lb.

MUSK KETONE.—34s. per lb.

MUSK XYLOL.—8s. 3d. per lb.

NEROLIN.—3s. 9d. per lb.

PHENYL ETHYL ACETATE.—12s. per lb.

PHENYL ETHYL ALCOHOL.—9s. 9d. per lb.

RHODINOL.—28s. 6d. per lb.

SATROL.—1s. 6d. per lb.

TERPINEOL.—1s. 6d. per lb.

VANILLIN.—20s. 6d. per lb.

## Essential Oils

ALMOND OIL.—11s. 6d. per lb.

ANISE OIL.—3s. 3d. per lb.

BERGAMOT OIL.—27s. per lb.

BOURBON GERANIUM OIL.—13s. 3d. per lb.

CAMPHOR OIL.—67s. 6d. per cwt.

CANANGA OIL, JAVA.—20s. per lb.

CINNAMON OIL, LEAF.—6d. per oz.

CASSIA OIL, 80/85%.—9s. 3d. per lb.

CITRONELLA OIL.—Java, 85/90%, 2s. 7d. Ceylon, 2s. per lb.

CLOVE OIL.—6s. 3d. per lb.

EUCALYPTUS OIL, 70/75%.—2s. per lb.

LAVENDER OIL.—French 38/40%, Esters, 18s. 6d. per lb.

LEMON OIL.—9s. per lb.

LEMONGRASS OIL.—4s. 6d. per lb.

ORANGE OIL, SWEET.—10s. 3d. per lb.

OTTO OF ROSE OIL.—Bulgarian, 70s. per oz. Anatolian, 30s. per oz.

PALMA ROSA OIL.—9s. 9d. per lb.

PEPPERMINT OIL.—Wayne County, 57s. 6d. per lb. Japanese, 11s. 9d. per lb.

PETITGRAIN OIL.—9s. per lb.

SANDAL WOOD OIL.—Mysore, 26s. per lb. Australian, 17s. 3d. per lb.

## London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, September 8, 1926.

CONSIDERING the continued stoppage in the coal industry causing a decreased demand from many consumers, the demand for chemical products can only be described as relatively satisfactory. Prices on the whole show little change. Export inquiry is much better and a fair amount of business has been booked.

### General Chemicals

ACETONE continues a nominal market and business is a matter of negotiation.  
ACID ACETIC continues in good demand and price is unchanged at £37 10s. per ton for 80% technical.  
ACID FORMIC remains a quiet market and price is unchanged at round about £53 per ton for 85% material.  
ACID LACTIC is only in small demand and price is unchanged at £43 per ton for 50% by weight.  
ACID OXALIC is in small demand and price is relatively steady at 3½d. to 3¾d. per lb.  
ACID TARTARIC is unchanged at 11½d. per lb. but the outlook is towards better prices.  
ALUMINA SULPHATE is firm and quite a good demand is reported for 17/18% material at about £5 10s. per ton.  
AMMONIUM CHLORIDE is quiet, price is nominally £19 10s. per ton, but this could be shaded for quantities.  
ARSENIC has been in better demand and price is inclined to harden. It is early yet to say whether this movement is likely to be permanent or whether it is only the outcome of shortage of fuel.  
BARIUM CHLORIDE is in good demand and is quoted at £9 15s. to £10 per ton.

COPPER SULPHATE.—A fair demand is in evidence and the present quotation is round about £23 per ton f.o.b., with the continental material a shade lower.

EPSOM SALTS.—Unchanged at about £5 10s. per ton and in good demand.

FORMALDEHYDE continues quiet but there is a tendency towards higher prices. Up to the present, however, there has been no actual change in the present value of £41 per ton.

LEAD ACETATE is firm and unchanged at £46 per ton for white and £43 per ton for brown.

METHYL ACETONE is firm and an increase in value is not unlikely. METHYL ALCOHOL.—In consequence of the American advance prices are still held here with higher tendency.

POTASSIUM CHLORATE is in fair request and price ranges from £32 to £32 10s. per ton.

POTASSIUM PERMANGANATE is in fair demand and is quoted at 7½d. per lb. for B.P.

POTASSIUM PRUSSIATE is quietly steady at 7d. per lb. with a fair demand.

SODA ACETATE is in fair request at £30 to £20 10s. per ton.

SODA BICHRIMATE is fairly active and British makers' price is unchanged at 3½d. per lb. Continental competition, however, is extremely keen.

SODA NITRITE.—The market in this article is unchanged at £20 10s. per ton, but only small business is passing.

SODA PHOSPHATE is firm and the value is unchanged at £14 per ton. SODA PRUSSIATE only moves slowly into consumption and is nominally unchanged at 3½d. per lb.

SODIUM HYPOSULPHITE is unchanged and quite good business is reported.

SODIUM SULPHIDE is unchanged at British makers' figures; poor demand.

ZINC SULPHATE firm and in good request at £14 per ton.

### Latest Oil Prices

LONDON.—LINSEED OIL steady and 2s. 6d. to 5s. higher. Spot, £31 15s., ex-mill; September, £30 12s. 6d.; October-December, £31 5s.; January-April, £32 2s. 6d. RAPE OIL quiet. Crude extracted, spot, £46 10s.; technical refined, £48 10s. COTTON OIL easy at occasionally 20s. decline. Bombay crude, £35; Egyptian crude, £36; refined common edible, £42; deodorised, £44. TURPENTINE closed steady at 9d. to 6d. per cwt. decline. American spot, 64s.; October-December, 64s. 9d.; January-April, 66s. 9d.; and May-June, 66s.

HULL.—LINSEED OIL, spot, £31 17s. 6d.; September and October-December, £32; January-April, £32 5s. COTTON OIL.—Bombay, crude, £34; Egyptian, crude, £35; edible refined, £39 10s.; technical, £37 10s. PALM KERNEL OIL.—Crushed, naked, 5½ per cent., £41 10s. GROUNDNUT OIL.—Crushed-extracted, £43 10s.; deodorised, £47 10s. SOYA OIL.—Extracted and crushed, £36 10s.; deodorised, £40. RAPE OIL.—Crude-extracted, £46; refined, £48 per ton. CASTOR OIL.—Unaltered. COD OIL.—Spot easier at 30s. 9d. per cwt., barrels, net cash terms, ex mills.

### Nitrogen Products

Export.—During the past week the sulphate of ammonia position remained unchanged. Prices are a little firmer, on the basis of about £10 17s. 6d. per ton f.o.b. There have been no reports recently of any large continental sales.

Home.—Merchants in various parts of the country are covering their requirements for the season. This is a direct consequence of the announcement of prices by the British producers. It is understood that fertiliser mixers have placed large orders for early delivery. The lower prices at which sulphate is being offered this year are stimulating the demand, especially as the change in nitrate of soda prices is very small.

Nitrate of Soda.—The market continues flat. As expectations from every side portend a further decrease in consumption of nitrate of soda, merchants are careful to cover only their minimum requirements. No doubt the end of the year will witness a revival of demand, because when that time is reached the consumers' demand will necessitate merchants having the goods ready.

### Calcium Cyanamide

WITH the end of the harvest a certain amount of attention is now being given to fertilisers for autumn application, and there is a more general inquiry for cyanamide for this purpose. The September price is £9 4s. per ton for 4 ton lots, carriage paid to any railway station in Great Britain.

### Nitrate Sales and Prices

SALES by the Nitrate Producers' Association during August amounted to 161,000 tons, the total quantity sold for delivery since last June being 432,000 tons and comprising 219,000 tons in June, 49,000 tons in July, 157,000 tons in August and 7,000 tons September-January delivery. The lowest price now acceptable by the Association is 18s. 9d. per quintal for first half September delivery. The ascertained coast stock at June 30 has been cabled as 1,210,000 tons, including the stocks of associated and non-associated producers, and is 12,300 tons below the total arrived at by deduction from monthly returns. The nitrate market is said to have been badly unsettled by reports of considerable public agitation in Chile to repeal those statutes of the association which preclude free selling for delivery before July, 1927. These apprehensions have since been allayed by the President of the Republic stating officially that the Government intends to maintain the association unimpaired until June 30, 1927.

### Commercial Advertisements on Postal Matter

THE Incorporated Society of British Advertisers, Ltd., has drawn the attention of the Postmaster-General to objections which have been lodged against his proposal (under powers conferred by the Economy Act, 1926) to accept private commercial advertisements on letters, postcards and printed matter transmitted by post. The objections raised are:—(1) That in principle it is a proposal to appropriate private property without payment or consent; that for the Post Office to impress these advertisements on correspondence is as much an infringement of private property rights as is "flyposting" on Government or private property. (2) That in practice it will be impossible to avoid injury to the majority of the users of the post through their communications being franked with advertising of competitive interest.

"We have every sympathy," the Society states, "with the Government's desire to economise, and no objections are made to the employment of this form of advertising to promote national interests or extend the use of the telephone, cash-on-delivery and other national services. But it is felt that to obtain revenue at the cost of introducing a dangerous precedent in state appropriation and providing opportunities for reasonable grievances on the part of the majority of the customers of the Post Office is a policy of doubtful economy."

## Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, September 8, 1926.

BUSINESS in the heavy chemical market, so far as home consumption is concerned, is very slack, but there is an appreciable amount of export inquiry going around. Prices on the whole remain steady.

### Industrial Chemicals

ACID ACETIC, 98/100%.—£55 to £67 per ton, according to quality and packing, c.i.f. U.K. port; 80% pure, £39 to £41 per ton; 80% technical, £38 to £39 per ton, c.i.f. U.K. ports.

ACID BORIC.—Crystal, granulated or small flakes, £37 per ton; powdered, £39 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Still quoted 4½d. per lb., delivered or f.o.b. U.K. ports, but the market is inclined to be firmer.

ACID CITRIC, B.P. CRYSTALS.—Rather easier at 1s. 3½d. per lb., less 5% ex store. Offered for prompt shipment at 1s. 3½d. per lb., less 5% ex wharf.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC, 80%.—Usual steady demand and price unchanged at £23 5s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—Higher quotations from the continent. Now quoted 3½d. per lb., ex wharf, duty paid. Spot material short; quoted 3½d. per lb., ex store.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—In moderate demand and price unchanged at 11½d. per lb., less 5% ex store. Offered for prompt shipment at 11½d. per lb., less 5% ex wharf.

ALUMINA SULPHATE, 17/18%, IRON FREE.—On offer from the continent at about £5 8s. 6d. per ton, c.i.f. U.K. ports. Spot material quoted £6 5s. per ton, ex store.

ALUM, LUMP POTASH.—On offer from the continent at £7 15s. per ton, c.i.f. U.K. ports. Spot material quoted £9 per ton, ex store. Crystal powder, £8 5s. per ton, ex store, or £7 12s. 6d. per ton, c.i.f. U.K. ports.

AMMONIA ANHYDROUS.—Imported material selling at about 11½d. to 11½d. per lb., ex wharf, containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks delivered or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £23 10s. to £25 10s. per ton, ex station. Continental on offer at about £21 10s. per ton, c.i.f. U.K. ports. Fine white crystals of continental manufacture quoted £18 5s. per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—In rather better demand. Spot material quoted £16 7s. 6d. per ton, ex store. Quoted £15 12s. 6d. per ton, ex wharf. Prompt dispatch from mines.

BARIUM CARBONATE, 98/100%.—White powdered quality quoted £6 15s. per ton, c.i.f. U.K. ports.

BARIUM CHLORIDE, 98/100%.—On offer from the continent at about £8 15s. per ton, c.i.f. U.K. ports. Spot material quoted £9 15s. per ton, ex store.

BLEACHING POWDER.—English material unchanged at £9 10s. per ton, ex station. Contracts 20s. per ton less. Continental now quoted £7 15s. per ton, c.i.f. U.K. ports.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. ports.

BORAX.—Granulated, £22 10s. per ton; crystals, £23 per ton; powdered, £24 per ton, carriage paid U.K. stations.

CALCIUM CHLORIDE.—English manufacturer's price unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, ex station. Continental quoted £3 17s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works, or at £4 2s. 6d. per ton, f.o.b. U.K. port, for export.

COPPER, SULPHATE.—Continental material on offer at about £22 per ton, ex wharf. Moderate inquiry for export and price of English material about £23 5s. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Spot material quoted £40 per ton, ex store. Quoted £39 per ton, c.i.f. U.K. ports, early shipment.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental quoted £2 17s. 6d. per ton, c.i.f. U.K. ports.

LEAD, RED.—Imported material on offer at £39 per ton, ex store.

LEAD, WHITE.—Now quoted £39 10s. per ton, ex store.

LEAD, ACETATE.—White crystals quoted £44 10s. per ton, c.i.f. U.K. ports. Prompt shipment. Brown about £40 5s. per ton, c.i.f. U.K. ports.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store, in moderate demand.

POTASH, CAUSTIC, 88/92%.—Syndicate prices vary from £25 10s. to £28 15s. per ton, c.i.f. U.K. ports according to quantity and destination. Spot material available at about £29 per ton.

POTASSIUM BICHROMATE.—Unchanged at 4½d. per lb., delivered.

POTASSIUM CARBONATE, 96/98%.—Quoted £25 5s. per ton, ex wharf, early delivery. Spot material on offer at £26 10s. per ton, ex store. 90/94% quality quoted £22 5s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 98/100%.—Rather lower offers from the Continent. Powdered quoted £25 10s. per ton, c.i.f. U.K. ports. Crystals, £27 15s. per ton.

POTASSIUM NITRATE (SALTPETRE).—Spot material quoted £24 per ton, ex store. On offer from the continent at about £21 15s. per ton, c.i.f. U.K. ports.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 7½d. per lb., ex store, spot delivery. To come forward 7d. per lb., ex wharf.

POTASSIUM PRUSSATE, YELLOW.—Now quoted 6½d. per lb., ex store, spot delivery. Quoted 6½d. per lb., c.i.f. U.K. ports.

SODA CAUSTIC.—76/77%, £17 10s. per ton; 70/72%, £16 2s. 6d. per ton; broken, 60%, £16 12s. 6d. per ton; powdered, 98/99%, £20 17s. 6d. per ton. All carriage paid U.K. stations, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—English material quoted £22 per ton, ex station. Continental on offer at about £20 10s. per ton, ex store, or to come forward £19 15s. per ton, c.i.f. U.K. ports.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—English price unchanged at 3½d. per lb., delivered.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, £1 7s. 6d. per ton more. Alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture, £9 per ton, ex station. Minimum 4 ton lots; pea crystals, £14 10s. per ton, ex station. Commercial of continental manufacture on offer at about £7 10s. per ton, c.i.f. U.K. ports.

SODIUM NITRATE.—Quoted £13 per ton, ex store; 96/98%, refined quality 7s. 6d. per ton extra.

SODIUM NITRITE, 100%.—Quoted £24 per ton, ex store. Offered from the continent at about £22 5s. per ton, c.i.f. U.K. ports.

SODIUM PRUSSATE, YELLOW.—Quoted 3½d. per lb., ex store. Offered from the continent at 3½d. per lb., ex wharf.

SODIUM SULPHATE, SALTCAKE.—Price for home consumption, £3 10s. per ton, ex works. Good inquiry for export and higher prices obtainable.

SODIUM SULPHIDE, 60/62%.—Solid, £13 5s. per ton; broken, £14 5s. per ton; flake, £15 5s. per ton; crystals, 31/34%, £8 12s. 6d. per ton. All delivered buyers works U.K., minimum 5 ton lots with slight reduction for contracts. 60/62%, solid quality offered from the continent at about £8 15s. per ton, c.i.f. U.K. ports. Broken quality 15s. per ton more. Crystals, 30/32%, about £6 10s. per ton, c.i.f. U.K. ports.

SULPHUR.—Flowers, £11 10s. per ton; roll, £10 5s. per ton; rock, £10 5s. per ton; floristella, £9 15s. per ton; ground American, £9 per ton; ex store, spot delivery. Prices nominal.

ZINC CHLORIDE.—British material, 96/98%, quoted £23 15s. per ton, f.o.b. U.K. ports; 98/100%, solid on offer from the continent at about £21 15s. per ton, c.i.f. U.K. ports; powdered 20s. per ton extra.

ZINC SULPHATE.—Continental make on offer at about £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

### Coal Tar Intermediates

BENZOIC ACID.—1s. 8½d. per lb., some home inquiries.

BENZIDINE BASE.—3s. 3d. per lb., fair home inquiries.

SODIUM NAPHTHONATE.—1s. 8d. to 1s. 9d. per lb., small home inquiries.

THE BRITISH ENGINEERING STANDARDS ASSOCIATION has now issued a specification (No. 263-1926) covering two grades of brazing solder. The copper contents for the two grades range from 53 to 55 per cent. and from 49 to 51 per cent. respectively, maximum limits being specified for the tin, antimony, arsenic, bismuth, iron, and lead permitted in the alloy. A table is included as an appendix to the specification giving a range of grain sizes of granular solder to which it is recommended that the material be ordered. Copies of this publication may be obtained from the B.E.S.A. Publications Department, 28, Victoria Street, London, S.W.1, price 1s. 2d. post free.



## Manchester Chemical Market

(FROM OUR OWN CORRESPONDENT.)

Manchester, September 9, 1926.

THE chemical market here remains very much under the influence of the coal dispute, and buyers for home use continue to purchase sparingly. The call for deliveries under contracts in many instances also continues disappointing, a number of industrial users, largely as a result of the coal situation, working at much below normal capacity. Export demand is still rather slow, although a number of inquiries have been reported during the past week. On the whole, prices keep very steady in most sections of the market.

### Heavy Chemicals

There is no alteration in bicarbonate of soda which is in moderate request and unchanged at £10 10s. per ton. Acetate of soda is on offer at £20 to £20 10s. per ton, without attracting a great deal of buying interest. Chlorate of soda meets with some inquiry and quotations are rather steadier at about 3½d. per lb. A quiet trade is being done in 58 per cent. alkali at £6 15s. to £7 per ton. There is not much business passing in hyposulphite of soda but prices show little alteration, commercial offering at £9 10s. per ton and photographic at £15 to £15 10s. Phosphate of soda is still rather slow with current values averaging £12 10s. per ton. Caustic soda is firm and meets with a steady demand at £15 2s. 6d. per ton for 60 per cent. material and £17 10s. for 76 per cent. Inquiry for prussiate of soda continues very moderate but quotations are unchanged at 3½d. per lb. Saltcake remains quiet at about £3 5s. per ton, with glauber salts still on offer at £3 15s., with no improvement in demand. Sulphide of sodium is in limited request at £10 10s. per ton for 60-65 per cent. concentrated solid, with commercial crystals quoted at about £8 5s. Nitrite of soda is about maintained at £19 10s. to £20 per ton, but there has been little improvement in the demand for this material. Bleaching powder is steady and meets with a fair amount of inquiry at £8 10s. per ton. Bichromate of soda is a quietly steady trade and values are held at round 3½d. per lb.

Caustic potash is unchanged at about £27 per ton, but the demand is somewhat limited. Carbonate of potash is in fair request and quotations keep steady at up to £26 15s. per ton. Permanganate of potash is maintained in spite of the restricted sales, with commercial quality offering at about 5½d. per lb. and B.P. at 6½d. Yellow prussiate of potash has been called for this week only in small quantities, with current values at about 6½d. per lb. Chlorate of potash is in moderate inquiry at about 3½d. per lb. Bichromate of potash keeps steady at about 4½d. per lb., and the demand for this is on a fair scale.

Export business in sulphate of copper is moderate, with f.o.b. values this week at about £22 15s. per ton. There has been little improvement so far in the demand for arsenic, but quotations are maintained at from £13 5s. to £13 10s. per ton, on rails, for white powdered, Cornish makes. Acetate of lime is in quiet demand at £17 10s. to £18 per ton for grey quality and round £8 for brown. The acetates of lead are also very firm at £46 10s. per ton for white and £42 for brown. There is not much call for nitrate of lead but prices are fully maintained at £41 per ton.

### Acids and Tar Products

Oxalic acid, although in quiet demand, is not too plentiful and prices are somewhat steadier than they have been at 3½d. to 3¾d. per lb. Acetic acid meets with a fair amount of inquiry at £37 to £38 per ton for 80 per cent. commercial quality and about £66 per ton for glacial. Tartaric acid is well held at about 11¾d. per lb. although inquiry has been rather inactive. Citric acid has attracted only a limited amount of interest at from 1s. 3½d. to 1s. 3¾d. per lb.

The coal tar products generally are in very short supply and quotations are firm in consequence. Up to £5 per ton is being quoted for forward deliveries of pitch and inquiry has been pretty good. Creosote oil is quoted at 7½d. to 7¾d. per gallon, and solvent naphtha at about 1s. 11d. Crystal carbolic acid is nominal at about 5d. per lb., with crude at 1s. 4½d. per gallon. Cresylic acid is unchanged at about 2s. per gallon, but in common with most of the other products there is little to be bought.

### Analysed Samples for Metallurgical Students

FOR some time the organisers of the British Chemical Standards movement have been asked to provide carefully analysed metallurgical samples at an appreciably cheaper rate than the well-known British Chemical Standards, in order to meet the need of college students, works laboratory apprentices, and others requiring materials on which to practise analysis. Such samples would save the professors or other instructors much time in preparing and analysing materials specially for this purpose, and should cost less and be more homogeneous and exact than a few drillings taken from a bar or ordinary casting and sent to a chemist for analysis in the usual way. In response to this demand, C. H. and N. D. Ridsdale, of Middlesbrough, have recently prepared such samples, in a form ready for analysis, from suitable selected materials. Each of the samples has been analysed in duplicate by two qualified chemists, and concurrent tests have also been made with British Chemical, United States Bureau, or other suitable standard samples of the nearest type.

In this work the organisers' experience with British Chemical Standards has afforded them particular advantages, and enabled them to produce samples of high quality with such economy that they can be sold at about one-quarter the price of British Chemical Standards, viz., 5s. to 7s. per 100 grams and £1 to £1 10s. per 500 grams. The exact analysis is supplied on a separate sheet with each sample in order to keep it private, but the approximate composition is furnished herewith. It will be seen that these analysed samples for students fulfil a different purpose from British Chemical Standards, which latter are being prepared and used for standardising, settling disputes, etc., as hitherto.

Material.		Approximate Percentage Composition.					
Ferrous.	Cd C.	Si.	S.	P.	Mn.	Gr C	
1. Mild carbon steel . . . . .	0.1	—	—	—	0.05	—	
2. Mild carbon steel . . . . .	0.1	0.2	0.05	0.05	0.5	—	
3. Medium carbon steel . . . . .	0.4	0.1	0.04	0.04	0.7	—	
4. Cast iron . . . . .	0.8	1.0	0.04	1.1	1.5	4	
Non-ferrous.	Cu.	Zn.	Sn.	P.	Mn.	Pb.	
5. Brass. . . . .	69	29	1	—	—	1	
6. Gunmetal . . . .	82	5	7	—	—	6	
7. Phosphor bronze	87	—	10	0.2	—	2	
				Fe			
10. Manganese bronze . . . . .	55	40	1	2	1	1	
					Sb.		
8. White metal .	5	—	60	—	1	24	
	CaCO <sub>3</sub>	MgCO <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	Al <sub>2</sub> O <sub>3</sub>	Siliceous matter.		
9. Dolomite . . . .	54	41	1	1	3		

### The Royal Technical College, Glasgow

WE have received the Calendar of the Royal Technical College, Glasgow, for the session 1926-27. The department of chemistry and technical chemistry, directed by Professor Thomas Gray (technical chemistry), with the assistance of Professor F. J. Wilson (organic chemistry) and Professor R. M. Caven (inorganic and analytical chemistry), includes, in addition to the usual curriculum of chemical teaching and laboratory work courses on technical chemistry, fuels and their applications (with laboratory work), dyes and their applications (with laboratory work), sugar manufacture, and coal tar and its products (with practical work). The department of metallurgy, under Professor J. H. Andrew, in addition to the usual programme of work, includes courses on refractory materials and slags, engineering metallurgy, etc. The college is affiliated to the University of Glasgow, and students may qualify for the university B.Sc. degree in applied science, and the Ph.D. The college itself grants a diploma and an associateship. The day classes of the college are also recognised as qualifying for the B.Sc. degree of the University of Edinburgh.

COLONEL SIR EDWARD ALLEN BROTHERTON, BART., has held a series of garden parties at his Leeds residence, Roundhay Hall, this week. On Monday afternoon he entertained the members of the Leeds City Council; on Tuesday, the members of the Library Association, which is holding its annual gathering this year in Leeds; and on Wednesday, the Educational Services of the City.

## Company News

**PARKES CHEMISTS.**—The directors announce the payment on September 20 of an interim dividend on the preference shares for the half-year ended August 31, 1926, at the rate of 6 per cent. per annum, less income tax.

**EASTWOOD'S CEMENT, LTD.**—The first report covering the period from May 6, 1925, to March 31, 1926, states that although this period was principally one of construction, trading was commenced in a small way, and a net profit is shown of £653, which is carried forward. It is hoped that the works may be opened early in the New Year.

**LONDON NITRATE CO., LTD.**—At a meeting held in Liverpool on September 6 the shareholders unanimously approved the proposed transfer of the company's undertaking to the New Tamarugal Nitrate Co., Ltd., in consideration of the allotment to the London Nitrate shareholders of 450,000 shares of £1 each in the New Tamarugal Co., which would admit of the allotment of 2½ shares of that company in respect of each share of £1 held in the London Nitrate Co.

**NEW TRANSVAAL CHEMICAL CO., LTD.**—An extraordinary general meeting and separate class meetings of the holders of first preference and of "A" preference shares will be held at Winchester House, Old Broad Street, London, on September 15, commencing at 2.30 p.m. The extraordinary general meeting is for the purpose of approving a draft agreement expressed to be made between the company and Associated Enterprises, Ltd., and altering the articles of association in order to give effect to the agreement. The class meeting of the holders of "A" preference shares is for the purpose of consenting to the modification (if any) of the dividend rights attached to the "A" preference shares.

**BRITISH GLUES AND CHEMICALS, LTD.**—A net loss of £22,919 is disclosed for the year ended May 31 last. In their report the directors state that the balance on the profit and loss account brought forward amounted to £48,770, from which is deducted the preference dividend, less tax, paid on September 29, 1925, requiring £15,313, leaving £33,457. Taking from this the net loss for the year, after making due allowance for depreciation (£29,123) and bad and doubtful debts, there remains £10,538. Of this amount the income-tax to May 31, 1926, absorbs £3,519, the balance of £7,019 being carried forward. The cumulative dividend on the 8 per cent. preference shares is in arrear from April 1, 1922, while no dividend has yet been paid on the ordinary shares. The annual meeting will be held at Cannon Street Hotel, London, on September 15, at 12 noon.

**NOBEL INDUSTRIES, LTD.**—The report for the year to December 25 last states that the accounts show a profit of £1,091,919 after allowing for income-tax deducted from dividends received from the constituent and associated companies and otherwise, and after making due provision for losses ascertained in the year in respect of certain specific investments. In 1921 a special investment reserve account was created as a provision against temporary market fluctuations in the values of the company's industrial investments. The directors no longer see any reason to earmark a reserve for this purpose, and have accordingly transferred the £550,000 which stood to its credit to general reserve. After providing £70,402 debenture interest (less tax) paid and accrued to December 31, 1925, and after writing off one-thirtieth of the cost of debenture issue (£2,977), the balance at credit of profit and loss is £1,018,540, which, with the amount brought forward of £666,597, amounts to £1,685,137. The dividend on the preference shares for the year absorbs £308,629. The directors have declared a final dividend on the ordinary shares at the rate of 7 per cent. per annum (less tax), paid July 8, 1926, making a total of 10 per cent. for the year, and a dividend on the deferred shares at the rate of 5 per cent. per annum (less tax), paid July 8, 1926, leaving a balance now available of £680,527. Of this available balance, the board recommend that £450,000 be allocated to the general reserve, thereby bringing this reserve up to £1,000,000, and thus leaving £230,527 to be carried forward.

**PRINCETON UNIVERSITY** has issued an attractive booklet outlining the work of its Chemistry Department and appealing for funds for a new building, equipment, and endowment. The amount needed is \$2,600,000.

## Tariff Changes

**INDIA.**—The copy of the Report issued by the Indian Tariff Board in connection with the statutory inquiry regarding the grant or continuance of protection to the steel industry in India after March 31, 1927, is now available.

**MEXICO.**—A new Sanitary Code for Mexico came into force on July 8, and contains regulations, etc., affecting medicinal products, patent medicines, etc.

**SPAIN.**—Pharmaceutical specialities and disinfectants, etc., offered for sale in Spain are required, as from September 1, to bear a distinctive mark on the outside cover, attesting that they have been registered.

**AUSTRIA.**—An Agreement supplementing the Austro-Hungarian Commercial Agreement of February 8, 1922, was signed on April 9, 1926, and came into force after the exchange of ratifications on August 14. Some reductions are announced, applicable to similar goods of United Kingdom origin imported into Austria in virtue of the most-favoured-nation provisions of the Commercial Treaty between Austria and this country. Under this Agreement, imported soft potash soap, with not more than 5 per cent. of alcohol, for the manufacture of lysoform (with permission) is now dutiable at a reduced rate of 10 gold kronen per 100 kilograms.

**PORTUGUESE COLONIES.**—The text of a Decree (in Portuguese) may be seen at the Department of Overseas Trade. The Decree provides that, for a period of twenty years, cotton seed, manures, insecticides, disinfectants, etc., are to be exempted from payment of import duties in the Colonies when destined for the cultivation and treatment of cotton.

## The Building Research Station

THE organisation and work of the Building Research Station of the Department of Scientific and Industrial Research, situated at Bucknalls Lane, Garston, Watford, is described in a pamphlet issued by the Department. The work is organised in two main divisions, general research and intelligence, and the station includes chemical, physical, and engineering laboratories. An information bureau has been established, and at regular intervals a series of abstracts of current literature is issued for the information of workers in this field. The station is prepared to undertake work within its purview for individuals, firms or groups of firms, on payment. If it is desired that the results of the work should be kept confidential, the charge made covers the full cost to the taxpayer. If, on the other hand, the work is of general interest and the results are to be freely available, the charge is correspondingly lower. Among the lines of research now being pursued may be mentioned investigations on the preservation of stonework; the physico-chemical phenomena of building materials, including study of possible gel structure; constitution, microstructure and correlation with physical properties of cements; the classification, physical and chemical properties of limes and plasters; paints; development of accelerated weathering tests, etc. In the chemical department of Bristol University Professor J. W. MacBain, F.R.S., is assisting in the investigation of the fundamental structure of certain building materials which show abnormal movements with changing moisture conditions. At Sheffield University, Professor C. H. Desch, F.R.S., is supervising experimental work on the mechanism of decay in building stones.

## Metallurgy at Chelsea Polytechnic

THE day and evening classes in metallurgy at Chelsea Polytechnic, Manresa Road, London, S.W.3, for session 1926-27, commence on September 20. A pamphlet has been issued giving details of the various courses. There are day and evening courses for students desirous of taking the London University degree in metallurgy or the Institute of Chemistry diploma in metallurgical chemistry. There are also courses for assayers, analytical and consulting chemists and engineers, for those engaged in various branches of the metallurgical and engineering industry, and for candidates for the Institution of Mechanical Engineers' Associate Membership examination. Facilities are offered for individual work and research. Among the special courses are:—"Mechanical Working and Testing of Metals and Alloys," "The Heat Treatment of Metals and Alloys," "The Metallurgy of Engineering Materials," and the "Armourers' and Braziers' Company Lectures."

## Commercial Intelligence

*The following are taken from printed reports, but we cannot be responsible for any errors that may occur.*

### Mortgages and Charges

[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an \*—followed by the date of the Summary, but such total may have been reduced.]

**BRITISH WHITE RUSSIAN OIL REFINERIES, LTD.,** Snodland. (M., 11/9/26.) Registered August 26, £240 2nd charge, to F. W. Snewin, 1, Thistlewaite Road, Clapton, dairyman; charged on land and buildings at Snodland, and company's interest in foreshore, embankment and wharf on River Medway. \*£750. January 5, 1926.

**COMMONWEALTH OIL CORPORATION, LTD.,** London, E.C. (M., 11/9/26.) Registered August 27, mortgage in substitution for mortgage registered July 28, 1926 (executed out of the U.K.), supplemental to trust deed dated November 24, 1919, securing £100,000 prior lien debenture stock and all further moneys (if any) which the mortgagees may advance to the company, or which may become owing by the company on any account whatsoever; charged on real and leasehold property of the company situate outside the U.K. \*£100,000 prior lien debenture stock, £150,000 1st mortgage debentures £123,577 income debenture stock. August 12, 1924.

**CORNBROOK CHEMICAL CO., LTD.,** London, E.C. (M., 11/9/26.) Registered August 31, two mortgages, to Bank; charged on Cornbrook Chemical Works, Stockport, and Millgate Hall, Millgate, Stockport, and adjoining cottages. \*Nil. July 21, 1924.

**HEPPELLS, LTD.,** London, S.W., chemists. (M., 11/9/26.) Registered August 24, charge by way of collateral security (supplemental to deeds dated December 22, 1924, June 2, 1926, and July 30, 1926, securing £85,000), to F. J. M. Pyne, 15, Lombard Street, E.C., bank manager and another; charged on 38 Chandos Street, St. Martin's-in-the-Fields. \*£48,000. October 26, 1925.

**NEWBRIGHTS, LTD.,** Brough (Yorks), manufacturers of polishes, powders, etc. (M., 11/9/26.) Registered August 30, £7,000 debentures; general charge (excluding leaseholds and landlord's fixtures). \*Nil. January 13, 1926.

**PRENTICE (A. W.) AND CO., LTD.,** Liverpool, oil, varnish, and paint manufacturers. (M., 11/9/26.) Registered August 25, mortgage to Bank; charged on 17 and 19, Oriol Street, Liverpool, with power, trade machinery, etc. \*Nil. June 15, 1926.

**RIDING AND GILLOW, LTD.,** Stacksteads, bleachers, dyers, etc. (M., 11/9/26.) Registered August 24, mortgage securing £1,400 and further advances, if any, to Building Society; charged on land and buildings at Fern Hill, Newchurch Road, Stacksteads. \*£8,000. May 19, 1926.

### Receivership

**DALTON CHEMICAL WORKS, LTD. (R., 11/9/26.)** G. W. Smith, of Huddersfield, C.A., was appointed Receiver on August 31, 1926, under powers contained in debentures dated December 10, 1924.

### London Gazette, &c.

#### Partnership Dissolved

**D. S. BRYSON AND SONS** (David Sibbald BRYSON and James Fyall BRYSON), oil refiners, paint and varnish merchants, and ship store merchants, Trades Lane, Dundee, as at September 4, 1926, by mutual consent, by the retiral of J. F. Bryson. The business will be carried on by D. S. Bryson under the old name.

## New Companies Registered

**FIELDING AND CO., LTD.**—Private company. Registered September 3. Nominal capital, £2,000 in £1 shares. To acquire from E. T. Fielding the benefit of certain existing inventions relating to the manufacture of a preparation for so treating mats and rugs as to prevent slipping and to the manufacture of a preparation for increasing the strength and durability and fixing the colour of silk and artificial silk, etc. Directors: E. T. Fielding (chairman), 32, Shaftesbury Avenue, London, W.1; J. Talbot, Ilford.

**JOSEPH GILL AND SONS, LTD.**—Private company. Registered September 6. Capital, £8,000 in £1 shares. Objects: to adopt an agreement with J. H. Gill, and to carry on the business of bleachers, dyers, makers of vitriol and bleaching and dyeing materials, etc. A director: J. H. Gill, Hambleton House, Hambleton, near Selby.

## Chemical Trade Inquiries

*The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.*

**GAS IN CYLINDERS.**—An old established firm of importers, etc., in Rangoon desire to obtain the representation of British manufacturers of gas in cylinders, such as is used for the manufacture of mineral waters. (Reference No. 314.)

**FERTILISERS AND INSECTICIDES.**—A well-recommended agent in St. Kitts, British West Indies, desires the representation in St. Kitts of exporters of sulphate of ammonia and other fertilisers, suitable for sugar cane and cotton cultivation, and insecticides. (Reference No. 315.)

**PITCH.**—An agent established in Liège desires to obtain the representation for the whole of Belgium of British exporters. Correspondence in French is preferred. (Reference No. 321.)

**CHEMICALS, ETC.**—An agent in Prague desires to secure the representation on a commission basis of British manufacturers of chemicals, drugs and pharmaceutical products, etc (Reference No. 324.)

## U.S.A. Increased Salt Production

THE salt produced for sale or use by operators of salt mines, wells and ponds in the United States in 1925 amounted to 7,397,498 short tons, valued at \$26,162,361, according to reports furnished by the producers to the Bureau of Mines. These figures show an increase of 9 per cent. in quantity and 2 per cent. in value over the figures for 1924, which were 6,803,115 short tons, valued at \$25,747,048. Evaporated salt sold, including pressed blocks made from evaporated salt, amounted to 2,235,180 short tons, valued at \$17,050,741, a slight increase in quantity over the sales for 1924. The sales of rock salt, including pressed blocks made from rock salt, amounted to 2,342,633 short tons, valued at \$7,444,799, an increase of 13 per cent. in quantity, but a decrease of about 1 per cent. in value. The salt content of the brine produced and used in the manufacture of chemicals in 1925 amounted to 2,819,685 short tons, an increase of 12 per cent. over 1924. The sales of pressed blocks by the original producers of the salt amounted to 171,207 short tons, valued at \$1,276,503, a slight decrease from the 172,344 tons, valued at \$1,322,744, sold in 1924. The figures for 1925 comprise 135,483 tons of blocks, valued at \$1,069,685, made from evaporated salt and 35,724 tons of blocks, valued at \$206,818, made from rock salt.

The quantity of bromine recovered from natural brines and sold or used in 1925 by the producers of salt amounted to 1,566,130 lb., valued at \$488,406. This is a decrease of 23 per cent. from the quantity reported in 1924. Calcium chloride (including calcium-magnesium chloride) recovered from natural brines in 1925 amounted to 67,870 short tons, valued at \$1,386,639, an increase in quantity of 15 per cent.



